# *MSC1000G*

*Management Switch Card*

# *User's Guide*

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www.zyxel.com

# About This User's Guide

## Intended Audience

This manual is intended for administrators who want to configure the IES-5000 using the web configurator or command line interface. You should have at least a basic knowledge of TCP/IP networking concepts and topology.

This guide is intended as a reference for the entire IES-5000 system. Not all features, screens, commands or command options in this guide are available for every line card.

## Related Documentation

- IES-5000 Series User's Guide

  Refer to the IES-5000 Series User's Guide for directions on installation, connections, maintenance, hardware trouble shooting and safety warnings.
- ALC1248G, ALC1272G, SLC1248G, VLC1224G, VLC1324G, VLC1348G-51, ELC1220G-55, and VOP1248G Line Card User's Guides

  These user's guides introduce the line cards and give detailed information about the line card's features and hardware.
- ZyXEL Web Site

  Please refer to www.zyxel.com for additional support documentation and product certifications.

## User Guide Feedback

Help us help you. Send all User Guide-related comments, questions or suggestions for improvement to the following address, or use e-mail instead. Thank you!

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# Document Conventions

### Warnings and Notes

These are how warnings and notes are shown in this User's Guide.

Warnings tell you about things that could harm you or your device.

Notes tell you other important information (for example, other things you may need to configure or helpful tips) or recommendations.

### Syntax Conventions

- The MSC1000G Management Switch Card may be referred to as the "MSC1000G", the "MSC", the "management switch card", the "Device", the "switch" or the "system" in this User's Guide.
- "IES-5000" refers to the IES-5000 series system including the main and splitter chassis and their cards. The IES-5000 may be referred to as the "IES".
- The ALC1248G-51 for ADSL over POTS (Annex A) Line Card may be referred to as the "ALC1248G", the "ALC" or the "line card" in this User's Guide.
- The ALC1248G-53 for ADSL over ISDN (Annex B) Line Card may be referred to as the "ALC1248G", the "ALC" or the "line card" in this User's Guide.
- The ALC1272G ADSL2/2+ Line Card may be referred to as the "ALC1272G", the "ALC" or the "line card" in this User's Guide.
- The SLC1248G SHDSL Line Card may be referred to as the "SLC1248G", the "SLC" or the "line card" in this User's Guide.
- The VLC1224G VDSL Line Card may be referred to as the "VLC1224G", the "VLC" or the "line card" in this User's Guide.
- The VLC1324G-51 for VDSL2 over POTS (Annex A) Line Card may be referred to as the "VLC1324G", the "VLC" or the "line card" in this User's Guide.
- The VLC1324G-53 for VDSL2 over ISDN (Annex B) Line Card may be referred to as the "VLC1324G", the "VLC" or the "line card" in this User's Guide.
- The VLC1348G-51 for VDSL2 over POTS (Annex A) Line Card may be referred to as the "VLC1348G", the "VLC" or the "line card" in this User's Guide.
- The ELC1220G-55 Fiber-based Fast Ethernet Line Card may be referred to as the "ELC1220G", the "ELC" or the "line card" in this User's Guide.
- The VOP1248G VoIP Line Card may be referred to as the "VOP1248G", the "VOP" or the "line card" in this User's Guide.
- Product labels, screen names, field labels and field choices are all in **bold** font.

- A key stroke is denoted by square brackets and uppercase text, for example, [ENTER] means the “enter” or “return” key on your keyboard.
- “Enter” means for you to type one or more characters and then press the [ENTER] key. “Select” or “choose” means for you to use one of the predefined choices.
- A right angle bracket ( > ) within a screen name denotes a mouse click. For example, **Maintenance > Log > Log Setting** means you first click **Maintenance** in the navigation panel, then the **Log** sub menu and finally the **Log Setting** tab to get to that screen.
- Units of measurement may denote the “metric” value or the “scientific” value. For example, “k” for kilo may denote “1000” or “1024”, “M” for mega may denote “1000000” or “1048576” and so on.

### Icons Used in Figures

Figures in this User’s Guide may use the following generic icons. The IES-5000 icon is not an exact representation of your device.

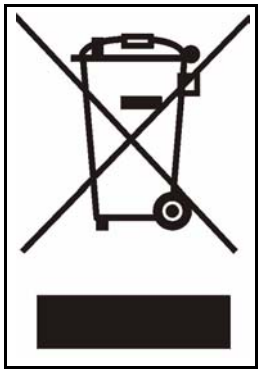
| | | |
|---|---|---|
| IES-5000 | Computer | Notebook computer |
| Server | Telephone | Switch |
| Router | | |

# Safety Warnings

For your safety, be sure to read and follow all warning notices and instructions.

- Do NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Do NOT expose your device to dampness, dust or corrosive liquids.
- Do NOT store things on the device.
- Do NOT install, use, or service this device during a thunderstorm. There is a remote risk of electric shock from lightning.
- Connect ONLY suitable accessories to the device.
- ONLY qualified service personnel should service or disassemble this device.
- Make sure to connect the cables to the correct ports.
- Place connecting cables carefully so that no one will step on them or stumble over them.
- Always disconnect all cables from this device before servicing or disassembling.
- Do not use the device outside, and make sure all the connections are indoors. There is a remote risk of electric shock from lightning.
- CAUTION: RISK OF EXPLOSION IF BATTERY (on the motherboard) IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS. Dispose them at the applicable collection point for the recycling of electrical and electronic equipment. For detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the store where you purchased the product.
- Do NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.
- Use only No. 26 AWG (American Wire Gauge) or larger telecommunication line cord.
- Warning! To avoid risk of electric shock, remove only one card at a time and do not place fingers or objects inside the chassis. Cover empty slots with slot covers.
- Refer also to the IES-5000 Series User's Guide and follow all safety warnings for installation, connections, maintenance and hardware trouble shooting.

This product is recyclable. Dispose of it properly.



# Contents Overview

**Introduction ..... 53**

Getting to Know Your MSC1000G ..... 55
Hardware Connections ..... 65

**Web Configurator ..... 71**

The Web Configurator ..... 73
Tutorials ..... 85
Access Control List Screens ..... 91
Alarm Screens ..... 131
Cluster Screens ..... 145
Diagnostic Screens ..... 151
Maintenance Screens ..... 163
Multicast Screens ..... 167
Subscriber Port Setup Screens ..... 181
Profile Screens ..... 265
Statistics Screens ..... 301
Switch Screens ..... 345
Sys Screens ..... 379
VLAN Screens ..... 395
VoIP ..... 403
Config Save ..... 435

**Commands ..... 437**

Commands ..... 439
acl Commands ..... 443
alarm Commands ..... 471
clear Commands ..... 479
cluster Commands ..... 481
config Commands ..... 487
diagnostic Commands ..... 489
ip Commands ..... 499
lcman Commands ..... 505
multicast Commands ..... 509
port Commands ..... 525
profile Commands ..... 585
show Commands ..... 637
switch Commands ..... 675

sys Commands .....711
vlan Commands ..... 735
voip Commands ..... 739
Firmware and Configuration File Maintenance ..... 759

**Troubleshooting and Product Specifications ..... 765**

Troubleshooting ..... 767
Product Specifications ..... 775

**Appendices and Index ..... 787**

# Table of Contents

**About This User's Guide** ..... **3**

**Document Conventions** ..... **4**

**Safety Warnings** ..... **6**

**Contents Overview** ..... **9**

**Table of Contents** ..... **11**

**List of Tables** ..... **37**

**List of Figures** ..... **45**

**Part I: Introduction** ..... **53**

**Chapter 1**
**Getting to Know Your MSC1000G** ..... **55**

1.1 Introduction ..... 55
1.1.1 Applications ..... 55
1.2 Ways to Manage the MSC1000G ..... 57
1.3 Features ..... 57

**Chapter 2**
**Hardware Connections** ..... **65**

2.1 Front Panel ..... 65
2.2 LEDs ..... 65
2.3 Ports and Connections ..... 66
2.3.1 Alarm Connections ..... 67
2.3.2 Gigabit Ethernet Interfaces ..... 68
2.3.3 SFP Slots ..... 68

**Part II: Web Configurator** ..... **71**

**Chapter 3**
**The Web Configurator** ..... **73**

3.1 Web Configurator Introduction ..... 73

3.2 System Login ..... 73
3.3 Navigation Panel ..... 74
3.4 Saving Your Configuration ..... 81
3.5 Logging Out of the Web Configurator ..... 82
3.6 System Info ..... 82
3.6.1 Card Status Details ..... 84

**Chapter 4**
**Tutorials ..... 85**

4.1 Initial Configuration ..... 85
4.2 H.248 Configuration Example ..... 87

**Chapter 5**
**Access Control List Screens ..... 91**

5.1 DHCP Relay Overview ..... 91
5.1.1 DHCP Relay Agent Information Option (Option 82) ..... 91
5.1.2 Private Format ..... 91
5.1.3 TR-101 Format ..... 92
5.1.4 PPPoE Intermediate Agent ..... 93
5.2 DHCP Relay Screen ..... 94
5.2.1 Example: DHCP Relay for Two VLANs ..... 95
5.3 DHCP Snooping ..... 96
5.3.1 Anti-IP Address Spoofing ..... 97
5.4 DHCP Snooping Configuration ..... 97
5.4.1 DHCP Snooping Slot Screen ..... 99
5.4.2 Example: DHCP Snooping ..... 100
5.5 Downstream Broadcast Screen ..... 101
5.5.1 Downstream Broadcast Slot Screen ..... 103
5.6 MAC Count Screen ..... 104
5.6.1 MAC Count Slot Screen ..... 106
5.7 MAC Filter Screen ..... 107
5.7.1 MAC Filter Slot Screen ..... 109
5.8 OUI Filter ..... 110
5.8.1 OUI Filter Slot Screen ..... 112
5.9 Packet Filter Screen ..... 113
5.10 Packet Filter Slot Screen ..... 115
5.11 IEEE 802.1x ..... 116
5.11.1 RADIUS ..... 117
5.12 802.1X PNAC Port Setup Screen ..... 117
5.12.1 802.1X PNAC Slot Screen ..... 119
5.13 RADIUS Screen ..... 120
5.14 Upstream Broadcast Control Screen ..... 121
5.15 ACL Rule Screen ..... 122

5.16 Anti-MAC Spoofing Screen ..... 123
5.17 DSCP Screens ..... 124
5.17.1 DSCP Setup Screen ..... 124
5.17.2 DSCP Port Screen ..... 125
5.17.3 DSCP Port Slot Screen ..... 127
5.18 PPPoE Screen ..... 128

**Chapter 6**
**Alarm Screens ..... 131**

6.1 Current Alarm Screen ..... 131
6.2 History Alarm Screen ..... 132
6.3 Alarm Port Setup Screen ..... 133
6.3.1 Alarm Port Setup Slot Screen ..... 135
6.4 Alarm Severity Assignment Screen ..... 136
6.5 Alarm Descriptions ..... 138
6.6 Alarm Clear Screen ..... 143
6.7 Alarm Input Screen ..... 143

**Chapter 7**
**Cluster Screens ..... 145**

7.1 Cluster Management Status Overview ..... 145
7.2 Cluster Management Status ..... 146
7.3 Cluster Management Configuration ..... 147
7.3.1 Cluster Member Management ..... 149

**Chapter 8**
**Diagnostic Screens ..... 151**

8.1 CFM Overview ..... 151
8.1.1 How CFM Works ..... 151
8.2 LDM Test Screen (DELT) ..... 152
8.2.1 Loop Diagnostics Test Parameters ..... 154
8.3 Loopback Screen ..... 154
8.4 IP Ping Screen ..... 155
8.5 Trace Route Screen ..... 156
8.6 The MLT Screen ..... 156
8.7 CFM Loopback Screen ..... 158
8.8 CFM Linktrace Screen ..... 159
8.9 SELT Test Screen ..... 160

**Chapter 9**
**Maintenance Screens ..... 163**

9.1 Configuration Backup Screen ..... 163
9.2 Configuration Restore Screen ..... 163

9.3 Configuration Reset Screen ..... 164
9.4 Firmware Upgrade Screen ..... 165
9.5 Reboot Screen ..... 166

**Chapter 10**
**Multicast Screens ..... 167**

10.1 IGMP Introduction ..... 167
10.1.1 IP Multicast Addresses ..... 167
10.1.2 IGMP Snooping ..... 167
10.1.3 IGMP Proxy ..... 167
10.1.4 IGMP Snooping and Proxy Note ..... 168
10.1.5 IGMP Fast Leave ..... 169
10.2 IGMP Setup Screen ..... 169
10.3 IGMP Filtering ..... 170
10.3.1 IGMP Port Setup Screen ..... 170
10.3.2 IGMP Bandwidth Screen ..... 172
10.4 Static Multicast ..... 174
10.5 Static Multicast Screen ..... 174
10.5.1 Static Multicast Slot Screen ..... 175
10.6 MVLAN Setup Screen ..... 176
10.7 MVLAN Port Setting Screen ..... 177
10.8 MVLAN Group Setup Screen ..... 178

**Chapter 11**
**Subscriber Port Setup Screens ..... 181**

11.1 ADSL Standards Overview ..... 181
11.2 VDSL Parameters ..... 181
11.2.1 PSD ..... 181
11.2.2 Limit PSD Mask ..... 181
11.2.3 Frequency Band Plan ..... 182
11.2.4 VDSL2 Profiles ..... 182
11.2.5 Configured Versus Actual Rate ..... 183
11.2.6 Impulse Noise Protection (INP) ..... 183
11.2.7 UPBO ..... 183
11.2.8 DPBO ..... 184
11.2.9 DPBO Electrical Length ..... 184
11.2.10 Rate Adaption ..... 185
11.2.11 RFI (Radio Frequency Interference) ..... 185
11.2.12 Upstream Power Back Off ..... 185
11.2.13 RFI (Radio Frequency Interference) ..... 185
11.3 Downstream and Upstream ..... 186
11.4 DSL Profiles ..... 186
11.5 Alarm Profiles ..... 186

11.6 Default Settings ..... 186
11.7 ADSL Port Setup ..... 186
11.7.1 ADSL Port Setup Line Card Screen ..... 189
11.7.2 ADSL Port Setup Advanced ..... 190
11.7.3 ADSL Option Mask Screen ..... 194
11.8 VDSL Port Setup ..... 195
11.8.1 VDSL Port Setup Line Card Screen ..... 198
11.8.2 VDSL Port Setup Advanced ..... 199
11.8.3 The VDSL Port Setup Screen (ctd.) ..... 204
11.8.4 VDSL Optionmask Screen ..... 206
11.8.5 The PSD Chart Parameter Screen ..... 208
11.8.6 Transparent LAN Service (TLS) ..... 209
11.8.7 TLS Network Example ..... 210
11.8.8 VDSL VLAN Setup ..... 211
11.8.9 VDSL PVLAN Setup ..... 213
11.9 SHDSL Port Setup ..... 214
11.9.1 SHDSL Port Setup Line Card Screen ..... 217
11.9.2 SHDSL Port Setup Advanced ..... 219
11.10 Permanent Virtual Circuits ..... 220
11.10.1 LLC ..... 221
11.10.2 VC Mux ..... 221
11.10.3 ATM Profiles ..... 221
11.11 PVC Setup Screen ..... 221
11.11.1 PVC Setup Slot Screen ..... 224
11.11.2 PVC Setup VLAN Screen ..... 225
11.11.3 PVC Setup PVLAN Screen ..... 226
11.12 Port Copy Screen ..... 227
11.13 IP Bridge Overview ..... 228
11.13.1 Upstream and Downstream Traffic ..... 230
11.13.2 IP Bridge Settings ..... 231
11.13.3 IP Bridge Configuration ..... 232
11.14 IPB ARP Proxy Screen ..... 232
11.15 IPB Domain Screen ..... 233
11.16 IPB Edgerouter Screen ..... 235
11.17 IPB Interface Screen ..... 237
11.18 IPBPVC Screen ..... 238
11.18.1 IPBPVC VLAN Setup Screen ..... 241
11.18.2 IPBPVC by Slot Screen ..... 242
11.19 IPB Route Screen ..... 243
11.20 G.bond Screen ..... 245
11.21 The VoIP SIP Port Setup Screen ..... 248
11.22 The SIP Port Setup Line Card Screen ..... 251
11.23 Advanced SIP Port Setup Screen ..... 253

11.24 The H248 Port Setup Screen ..... 254
11.25 The H.248 Port Setup Line Card Screen ..... 256
11.26 The Advanced H248 Port Setup Screen ..... 258
11.27 ENET Port Setup ..... 259
11.27.1 ENET Port Setup Line Card Screen ..... 261
11.27.2 ENET VLAN Setup ..... 263

**Chapter 12**
**Profile Screens ..... 265**

12.1 Profiles Overview ..... 265
12.2 Interleave Delay ..... 265
12.2.1 Fast Mode ..... 266
12.3 Configured Versus Actual ADSL Rates ..... 266
12.4 ADSL Profile Screen ..... 266
12.5 VDSL Profile Setup ..... 269
12.6 Configured Versus Actual SHDSL Rates ..... 272
12.7 N-wire Mode ..... 272
12.8 SHDSL Profile Screen ..... 273
12.9 ATM QoS ..... 274
12.10 Traffic Shaping ..... 275
12.10.1 ATM Traffic Classes ..... 275
12.10.2 Traffic Parameters ..... 275
12.11 ATM Profile Screen ..... 277
12.12 Alarm ADSL Profile Screen ..... 278
12.13 Alarm VDSL Profile Screen ..... 280
12.14 Alarm SHDSL Profile Screen ..... 282
12.15 IGMP Filter Profile Screen ..... 283
12.16 The Profile VoIP SIP Screen ..... 285
12.17 Profile VoIP SIP Call Service Screen ..... 287
12.18 The Profile VoIP DSP Screen ..... 290
12.19 The Profile VoIP H248 Screen ..... 292
12.20 VoIP Dial Plan Profile Screen ..... 294
12.21 The IPQoS Screen ..... 296
12.22 Access Control Logic (ACL) Overview ..... 298
12.22.1 ACL Profile Rules ..... 298
12.22.2 ACL Profile Actions ..... 298
12.23 ACL Profile Setup Screen ..... 298

**Chapter 13**
**Statistics Screens ..... 301**

13.1 ARP Table ..... 301
13.1.1 How ARP Works ..... 301
13.2 ARP Table Screen ..... 301

13.3 DHCP ..... 302
13.4 MAC Table ..... 303
13.5 MAC Table Screen ..... 304
13.6 IGMP Status Screen ..... 305
13.6.1 IGMP Port Statistics ..... 306
13.7 IP Bridge ARP Proxy Screen ..... 307
13.8 IP Bridge Interfaces Screen ..... 308
13.9 IP Bridge Routes Screen ..... 309
13.10 Online Users Screen ..... 310
13.11 Port Statistics ..... 310
13.11.1 MSC Port Statistics ..... 311
13.11.2 Detailed MSC Ethernet Port Statistics ..... 312
13.11.3 MSC RMON Statistics ..... 314
13.11.4 DSL Line Card Statistics ..... 317
13.11.5 ELC Port Statistics ..... 329
13.11.6 Detailed ELC Port Statistics ..... 330
13.11.7 VOP Port Statistics ..... 331
13.11.8 Detailed VOP Port Statistics ..... 332
13.12 Dot3ad ..... 334
13.13 VLAN Statistics ..... 335
13.13.1 VLAN Port Statistics ..... 336
13.14 MSTP Statistics ..... 336
13.14.1 MSTP CIST Statistics ..... 336
13.14.2 MSTP CIST Statistics: Port Details ..... 338
13.14.3 MSTP MSTI Statistics ..... 339
13.15 IP Statistics ..... 341
13.16 G.bond Statistics ..... 342
13.17 CFM Endpoint Statistics ..... 342
13.18 H248 Statistics ..... 343
13.19 Proxy Server Statistics ..... 344

**Chapter 14**
**Switch Screens ..... 345**

14.1 Ethernet Port Trunking ..... 345
14.2 Dynamic Link Aggregation ..... 345
14.3 Link Aggregation ID ..... 346
14.4 Queuing Overview ..... 346
14.4.1 Strict Priority Queuing (SPQ) ..... 347
14.4.2 Weighted Round Robin Scheduling (WRR) ..... 347
14.5 Switch Setup General Screen ..... 347
14.6 Switch Setup Dot3ad Screen ..... 349
14.7 Switch Setup QSchedule Screen ..... 350
14.8 Switch Setup Isolation Screen ..... 351

14.9 Spanning Tree Protocols ..... 352
14.9.1 STP and RSTP ..... 352
14.9.2 Multiple STP ..... 354
14.10 MSTP Setup ..... 357
14.10.1 MSTP Bridge Settings ..... 357
14.10.2 MSTP Port Settings ..... 359
14.10.3 MSTP Configuration Example ..... 360
14.11 Switch Port ..... 362
14.11.1 Uplink and Subtending Modes ..... 362
14.11.2 Flow Control ..... 362
14.11.3 Port VLAN Trunking ..... 363
14.11.4 Bandwidth Control ..... 363
14.11.5 Broadcast Storm Control ..... 363
14.12 Switch Port Setup Port Screen ..... 364
14.13 Switch Port Setup 802.1P/1Q Screen ..... 365
14.14 Switch Port Setup Bandwidth Screen ..... 365
14.15 Switch Port Setup Broadcast Screen ..... 366
14.16 Switch Port Setup DSCP ..... 367
14.16.1 Switch Port Setup DSCP Screen ..... 367
14.17 Switch CFM Screens ..... 369
14.17.1 CFM MA Screen ..... 369
14.17.2 CFM Endpoint Screen: MEP ..... 371
14.17.3 CFM Endpoint Screen: MIP ..... 373
14.17.4 CFM Endpoint: MIP Slot Screen ..... 374
14.17.5 Switch CFM LBR Screen ..... 375
14.17.6 Switch CFM LBR Slot Screen ..... 377

**Chapter 15**
**Sys Screens ..... 379**

15.1 SNMP ..... 379
15.1.1 Supported MIBs ..... 380
15.2 SNMP Screen ..... 380
15.3 Service Access Control Screen ..... 382
15.3.1 Secured Client Screen ..... 383
15.4 General Setup ..... 384
15.5 IP Setup ..... 385
15.6 Syslog Screen ..... 386
15.7 User Account Screen ..... 387
15.8 RADIUS Service Types ..... 389
15.9 TACACS+ ..... 389
15.10 User Account Authentication Screen ..... 389
15.11 Monitor Screen ..... 390

**Chapter 16**
**VLAN Screens ..... 395**

16.1 VLAN Introduction ..... 395
16.2 IEEE 802.1Q Tagged VLAN ..... 395
16.2.1 Forwarding Tagged and Untagged Frames ..... 396
16.3 Automatic VLAN Registration ..... 396
16.3.1 GARP ..... 396
16.3.2 GVRP ..... 397
16.4 Tagged Frames Forwarding Example ..... 397
16.5 Untagged Frames Forwarding Example ..... 397
16.6 VLAN Setup Screen ..... 398
16.7 VLAN Port Setting Screen ..... 399
16.8 VLAN Port Setting Slot Screen ..... 400
16.9 VLAN Port Setting Slot Detail Screen ..... 401

**Chapter 17**
**VoIP ..... 403**

17.1 VoIP Overview ..... 403
17.1.1 Introduction to VoIP ..... 403
17.1.2 SIP and H.248 ..... 403
17.1.3 Introduction to SIP ..... 403
17.1.4 Introduction to H.248 ..... 407
17.1.5 RTP ..... 413
17.1.6 Voice Coding ..... 414
17.1.7 PSTN Call Setup Signaling ..... 414
17.2 Using Call Services ..... 415
17.2.1 Do Not Disturb ..... 415
17.2.2 Call Waiting ..... 416
17.2.3 CLIR ..... 416
17.2.4 Call Transfer ..... 417
17.3 The VoIP ARP Screen ..... 418
17.4 The VoIP Countrycode Screen ..... 418
17.5 The Countrycode Detail Screen ..... 420
17.6 The VoIP IP Screen ..... 422
17.7 The VoIP Route Screen ..... 423
17.8 The Number Plan Screen ..... 424
17.9 The VoIP H248 Screen ..... 426
17.10 The Local Help Screen ..... 427
17.11 The VoIP Key Pattern Screen ..... 429
17.12 Dialplan Screen ..... 431
17.13 The Localcall Screen ..... 432

**Chapter 18**
**Config Save ..... 435**

18.1 The Config Save Screen ..... 435

**Part III: Commands ..... 437**

**Chapter 19**
**Commands ..... 439**

19.1 Commands Introduction ..... 439
19.2 Command Conventions ..... 439
19.3 Getting Help ..... 440
19.3.1 List of Available Commands ..... 440
19.3.2 Detailed Command Information ..... 440
19.4 Common Command Notation ..... 441
19.5 Command Privilege Levels ..... 442
19.6 Saving Your Configuration ..... 442
19.7 Commands Summary ..... 442

**Chapter 20**
**acl Commands ..... 443**

20.1 acl Commands Summary ..... 443
20.2 acl antimacspoof Commands ..... 448
20.2.1 acl antimacspoof Command ..... 449
20.3 acl dhcprelay82 Commands ..... 449
20.3.1 acl dhcprelay82 clearinfo Command ..... 449
20.3.2 acl dhcprelay82 enable Command ..... 449
20.3.3 acl dhcprelay82 info Command ..... 450
20.3.4 acl dhcprelay82 optionmode Command ..... 450
20.3.5 acl dhcprelay82 relaymode Command ..... 450
20.3.6 acl dhcprelay82 server active Command ..... 451
20.3.7 acl dhcprelay82 server delete Command ..... 451
20.3.8 acl dhcprelay82 server set Command ..... 451
20.3.9 acl dhcprelay82 set Command ..... 452
20.3.10 acl dhcprelay82 show Command ..... 452
20.4 DHCP Relay Option 82 (Agent Information) Sub-option 2 (Remote ID) ..... 452
20.4.1 Option 82 Sub-option 2 Enable Command ..... 453
20.4.2 Option 82 Sub-option 2 Disable Command ..... 453
20.4.3 Option 82 Sub-option 2 Set Command ..... 453
20.5 acl dhcpsnoop Commands ..... 453
20.5.1 acl dhcpsnoop disable Command ..... 454
20.5.2 acl dhcpsnoop enable Command ..... 454

20.5.3 acl dhcpsnoop flush Command ..... 454
20.5.4 acl dhcpsnoop pool set Command ..... 454
20.5.5 acl dhcpsnoop pool delete Command ..... 454
20.5.6 acl dhcpsnoop show Command ..... 455
20.6 acl dot1x Commands ..... 455
20.6.1 acl dot1x disable Command ..... 455
20.6.2 acl dot1x enable Command ..... 455
20.6.3 acl dot1x port control Command ..... 455
20.6.4 acl dot1x port disable Command ..... 456
20.6.5 acl dot1x port enable Command ..... 456
20.6.6 acl dot1x port period Command ..... 456
20.6.7 acl dot1x port reauth Command ..... 456
20.6.8 acl dot1x port show Command ..... 456
20.6.9 acl dot1x radius ip Command ..... 457
20.6.10 acl dot1x radius port Command ..... 457
20.6.11 acl dot1x radius secret Command ..... 457
20.6.12 acl dot1x show Command ..... 458
20.7 acl dscp Command ..... 458
20.7.1 acl dscp set Command ..... 458
20.7.2 acl dscp show Command ..... 459
20.8 acl maccount Commands ..... 459
20.8.1 acl maccount disable Command ..... 459
20.8.2 acl maccount enable Command ..... 460
20.8.3 acl maccount set Command ..... 460
20.8.4 acl maccount show Command ..... 460
20.9 acl macfilter Commands ..... 461
20.9.1 acl macfilter delete Command ..... 461
20.9.2 acl macfilter disable Command ..... 462
20.9.3 acl macfilter enable Command ..... 462
20.9.4 acl macfilter mode Command ..... 462
20.9.5 acl macfilter set Command ..... 462
20.9.6 acl macfilter show Command ..... 463
20.10 acl ouifilter Commands ..... 463
20.10.1 acl ouifilter disable Command ..... 463
20.10.2 acl ouifilter enable Command ..... 463
20.10.3 acl ouifilter mode Command ..... 464
20.10.4 acl ouifilter set Command ..... 464
20.10.5 acl ouifilter show Command ..... 464
20.11 acl pktfilter Commands ..... 465
20.11.1 acl pktfilter set Command ..... 465
20.11.2 acl pktfilter show Command ..... 466
20.12 PPPoE Agent Information ..... 466
20.12.1 acl pppoeagent clearinfo Command ..... 466

20.12.2 acl pppoeagent enable Command ..... 466
20.12.3 acl pppoeagent delete Command ..... 467
20.12.4 acl pppoeagent disable Command ..... 467
20.12.5 acl pppoeagent info Command ..... 467
20.12.6 acl pppoeagent optionmode Command ..... 467
20.12.7 acl pppoeagent set Command ..... 468
20.12.8 acl pppoeagent show Command ..... 468
20.13 acl rule Commands ..... 468
20.13.1 acl rule delete Command ..... 468
20.13.2 acl rule set Command ..... 469
20.13.3 acl rule show Command ..... 469
20.14 acl usbcastctrl Commands ..... 469
20.14.1 acl usbcastctrl set ..... 469
20.14.2 acl usbcastctrl show ..... 470

**Chapter 21**
**alarm Commands ..... 471**

21.1 General alarm Command Parameters ..... 471
21.2 alarm Commands Summary ..... 471
21.3 alarm Commands ..... 473
21.3.1 alarm clear Command ..... 473
21.3.2 alarm cutoff Command ..... 473
21.3.3 alarm edit Command ..... 473
21.3.4 alarm history clear Command ..... 473
21.3.5 alarm history show Command ..... 474
21.3.6 alarm port set Command ..... 474
21.3.7 alarm port show Command ..... 474
21.3.8 alarm show Command ..... 475
21.3.9 alarm tablelist Command ..... 476
21.3.10 alarm xedit Command ..... 477

**Chapter 22**
**clear Commands ..... 479**

22.1 clear Commands Summary ..... 479
22.2 clear Command Example ..... 480

**Chapter 23**
**cluster Commands ..... 481**

23.1 General cluster Command Parameters ..... 481
23.2 cluster commands Summary ..... 481
23.2.1 cluster disable Command ..... 482
23.2.2 cluster enable manager Command ..... 482
23.2.3 cluster enable member Command ..... 482

23.2.4 cluster login Command ..... 482
23.2.5 cluster member candidate show Command ..... 483
23.2.6 cluster member candidate flush Command ..... 483
23.2.7 cluster member delete Command ..... 483
23.2.8 cluster member set Command ..... 483
23.2.9 cluster member show Command ..... 484
23.2.10 cluster show Command ..... 484
23.2.11 cluster vlan Command ..... 485
23.3 Cluster Member Firmware and Configuration File Management ..... 486

**Chapter 24**
**config Commands ..... 487**

24.1 config Commands Summary ..... 487
24.1.1 config default Command ..... 487
24.1.2 config save Command ..... 487
24.1.3 config show Command ..... 488

**Chapter 25**
**diagnostic Commands ..... 489**

25.1 Terms and Definitions ..... 489
25.2 General diagnostic Command Parameters ..... 490
25.3 diagnostic Commands Summary ..... 490
25.4 diagnostic Commands ..... 492
25.4.1 diagnostic cfm loopback Command ..... 492
25.4.2 diagnostic cfm linktrace show Command ..... 492
25.4.3 diagnostic cfm linktrace set Command ..... 493
25.4.4 diagnostic ldm show Command ..... 493
25.4.5 diagnostic ldm test Command ..... 494
25.4.6 diagnostic loopback f5 Command ..... 495
25.4.7 diagnostic loopback internal Command ..... 495
25.5 diagnostic mlt test Commands ..... 495
25.5.1 diagnostic mlt test Command ..... 496
25.5.2 diagnostic mlt show Command ..... 496
25.5.3 diagnostic mlt relay set Command ..... 496
25.5.4 diagnostic mlt relay show Command ..... 497
25.6 diagnostic selt Commands ..... 497
25.6.1 diagnostic selt show Command ..... 497
25.6.2 diagnostic selt test Command ..... 497

**Chapter 26**
**ip Commands ..... 499**

26.1 ip Commands Summary ..... 499
26.2 ip Commands ..... 500

26.2.1 ip arp flush Command ..... 500
26.2.2 ip arp show Command ..... 500
26.2.3 ip gateway Command ..... 500
26.2.4 ip ping Command ..... 501
26.2.5 ip route delete Command ..... 501
26.2.6 ip route set Command ..... 501
26.2.7 ip route show Command ..... 502
26.2.8 ip show Command ..... 502
26.2.9 ip set Command ..... 502
26.2.10 ip tracert Command ..... 504

**Chapter 27**
**lcman Commands ..... 505**

27.1 lcman Commands Summary ..... 505
27.2 lcman Commands ..... 505
27.2.1 lcman enable Command ..... 505
27.2.2 lcman disable Command ..... 505
27.2.3 lcman reset Command ..... 506
27.2.4 lcman show Command ..... 506

**Chapter 28**
**multicast Commands ..... 509**

28.1 multicast Commands Summary ..... 509
28.2 multicast bandwidth Commands ..... 512
28.2.1 multicast bandwidth default Command ..... 512
28.2.2 multicast bandwidth delete Command ..... 512
28.2.3 multicast bandwidth set Command ..... 512
28.3 multicast bandwidth port Commands ..... 513
28.3.1 multicast bandwidth port disable Command ..... 513
28.3.2 multicast bandwidth port enable Command ..... 513
28.3.3 multicast bandwidth port set Command ..... 513
28.3.4 multicast bandwidth port show Command ..... 514
28.4 multicast fastleave Commands ..... 514
28.4.1 multicast igmp fastleave enable Command ..... 514
28.4.2 multicast igmp fastleave disable Command ..... 514
28.4.3 multicast igmp fastleave timer Command ..... 514
28.5 multicast igmp Commands ..... 515
28.5.1 multicast igmp disable Command ..... 515
28.5.2 multicast igmp enable Command ..... 515
28.5.3 multicast igmp qryvid delete Command ..... 515
28.5.4 multicast igmp qryvid set Command ..... 515
28.5.5 multicast igmp qryvid show Command ..... 516
28.5.6 multicast igmp show Command ..... 516

28.6 IGMP Count Limit ..... 516
28.7 multicast igmpcount Commands ..... 516
28.7.1 multicast igmpcount disable Command ..... 516
28.7.2 multicast igmpcount enable Command ..... 517
28.7.3 multicast igmpcount set Command ..... 517
28.7.4 multicast igmpcount show Command ..... 517
28.8 multicast igmpfilter Commands ..... 518
28.8.1 multicast igmpfilter set Command ..... 518
28.8.2 multicast igmpfilter show Command ..... 518
28.9 multicast igmpmsgcount Commands ..... 519
28.9.1 multicast igmpmsgcount disable Command ..... 519
28.9.2 multicast igmpmsgcount enable Command ..... 519
28.9.3 multicast igmpmsgcount set Command ..... 520
28.9.4 multicast igmpmsgcount show Command ..... 520
28.10 multicast mvlan Commands ..... 520
28.10.1 multicast mvlan delete Command ..... 520
28.10.2 multicast mvlan disable Command ..... 520
28.10.3 multicast mvlan enable Command ..... 521
28.10.4 multicast mvlan group delete Command ..... 521
28.10.5 multicast mvlan group set Command ..... 521
28.10.6 multicast mvlan group delete Command ..... 521
28.10.7 multicast mvlan name Command ..... 521
28.10.8 multicast mvlan set Command ..... 522
28.10.9 multicast mvlan show Command ..... 522
28.11 multicast smcast Commands ..... 522
28.11.1 multicast smcast delete Command ..... 522
28.11.2 multicast smcast set Command ..... 523
28.11.3 multicast smcast show Command ..... 523

**Chapter 29**
**port Commands ..... 525**

29.1 General port Command Parameters ..... 525
29.2 port Commands Summary ..... 525
29.3 port Commands ..... 536
29.4 port adsl Commands ..... 536
29.4.1 port adsl alarmprof Command ..... 536
29.4.2 port adsl annexl disable Command ..... 537
29.4.3 port adsl annexl enable Command ..... 537
29.4.4 port adsl annexm disable Command ..... 537
29.4.5 port adsl annexm enable Command ..... 538
29.4.6 port adsl annexi disable Command ..... 538
29.4.7 port adsl annexi enable Command ..... 538
29.4.8 port adsl dscarrier0 Command ..... 538

29.4.9 port adsl dscarrier1 Command ..... 539
29.4.10 port adsl inpmin Command ..... 540
29.4.11 port adsl optionmask Command ..... 540
29.4.12 port adsl pmm disable Command ..... 541
29.4.13 port adsl pmm enable Command ..... 541
29.4.14 port adsl power Command ..... 542
29.4.15 port adsl psd maximum Command ..... 543
29.4.16 port adsl set Command ..... 543
29.4.17 port adsl uscarrier Command ..... 544
29.5 port copy Command ..... 544
29.6 port disable Command ..... 545
29.7 port enable Command ..... 545
29.8 Enet Commands ..... 545
29.8.1 port enet bandwidth Command ..... 545
29.8.2 port enet dot3ad aggport Command ..... 546
29.8.3 port enet dot3ad disable Command ..... 546
29.8.4 port enet dot3ad enable Command ..... 546
29.8.5 port enet dot3ad show Command ..... 546
29.8.6 port enet flowctrl disable Command ..... 547
29.8.7 port enet flowctrl enable Command ..... 547
29.8.8 port enet frametype Command ..... 547
29.8.9 port enet priority Command ..... 548
29.8.10 port enet pvid Command ..... 548
29.8.11 port enet show Command ..... 548
29.8.12 port enet tls Commands ..... 549
29.8.13 port enet vlan Commands ..... 550
29.9 G.bond Commands ..... 550
29.9.1 port gbond set Command ..... 550
29.9.2 port gbond show Command ..... 551
29.9.3 port gbond delete Command ..... 551
29.10 IP Bridge Commands ..... 551
29.11 IP Bridge ARP Proxy Commands ..... 552
29.11.1 port ipbpvc arpproxy age Command ..... 552
29.11.2 port ipbpvc arpproxy flush Command ..... 552
29.11.3 port ipbpvc arpproxy show Command ..... 552
29.12 IP Bridge PVC Commands ..... 553
29.13 port ipbpvc delete Command ..... 553
29.14 IP Bridge Domain Commands ..... 553
29.14.1 port ipbpvc domain delete Command ..... 554
29.14.2 port ipbpvc domain dhcpvlan enable Command ..... 554
29.14.3 port ipbpvc domain dhcpvlan disable Command ..... 554
29.14.4 port ipbpvc domain set Command ..... 555
29.14.5 port ipbpvc domain show Command ..... 555

29.14.6 port ipbpvc domain vlan Command ..... 556
29.15 IP Bridge Edge Router Commands ..... 556
29.15.1 port ipbpvc edgerouter delete Command ..... 556
29.15.2 port ipbpvc edgerouter set Command ..... 557
29.15.3 port ipbpvc edgerouter show Command ..... 557
29.16 IP Bridge Interface Commands ..... 558
29.16.1 port ipbpvc interface delete Command ..... 558
29.16.2 port ipbpvc interface set Command ..... 558
29.16.3 port ipbpvc interface show Command ..... 559
29.17 IP Bridge Routing Table Commands ..... 559
29.17.1 port ipbpvc route delete Command ..... 560
29.17.2 port ipbpvc route set Command ..... 560
29.17.3 adsl ipbpvc route show Command ..... 561
29.17.4 port ipbpvc set Command ..... 561
29.17.5 port ipbpvc show Command ..... 562
29.17.6 port ipbpvc vlan Command ..... 563
29.18 port name Command ..... 563
29.19 PPPoA to PPPoE (PAE) Translation ..... 563
29.19.1 port paepvc delete Command ..... 564
29.19.2 port paepvc set Command ..... 564
29.19.3 port paepvc show Command ..... 565
29.20 port pots gain Command ..... 565
29.21 port ppvc Commands ..... 565
29.21.1 port ppvc delete Command ..... 566
29.21.2 port ppvc member delete Command ..... 566
29.21.3 port ppvc member set Command ..... 566
29.21.4 port ppvc set Command ..... 567
29.21.5 port ppvc show Command ..... 567
29.21.6 port ppvc vlan Command ..... 568
29.22 port pvc Commands ..... 569
29.22.1 port pvc delete Command ..... 569
29.22.2 port pvc mvlan disable Command ..... 569
29.22.3 port pvc mvlan enable Command ..... 569
29.22.4 port pvc set Command ..... 569
29.22.5 port pvc show Command ..... 570
29.22.6 port pvc usratelimit enable Command ..... 570
29.22.7 port pvc usratelimit disable Command ..... 570
29.22.8 port pvc usratelimit set Command ..... 570
29.22.9 port pvc usratelimit show Command ..... 571
29.22.10 port pvc vlan Command ..... 571
29.23 port shdsl Commands ..... 572
29.23.1 port shdsl alarmprof Command ..... 572
29.23.2 port shdsl pbo Command ..... 572

29.23.3 port shdsl pmms Command ..... 573
29.23.4 port shdsl set Command ..... 574
29.24 port show Command ..... 574
29.25 port sip set Command ..... 574
29.26 port sip opmode Command ..... 575
29.27 port tel Command ..... 575
29.28 Transparent LAN Service (TLS) ..... 576
29.28.1 port tlspvc delete Command ..... 576
29.28.2 port tlspvc set Command ..... 576
29.28.3 port tlspvc show Command ..... 577
29.29 port vdsl Commands ..... 577
29.29.1 port vdsl alarmprof Command ..... 577
29.29.2 port vdsl frametype Command ..... 577
29.29.3 port vdsl frequencyplan Command ..... 578
29.29.4 port vdsl inpmin Command ..... 578
29.29.5 port vdsl ipqos Command ..... 578
29.29.6 port vdsl optionmask Command ..... 579
29.29.7 port vdsl limitmask set Command ..... 579
29.29.8 port vdsl limitmask show Command ..... 580
29.29.9 port vdsl priority Command ..... 581
29.29.10 port vdsl pvid Command ..... 581
29.29.11 port vdsl pvlan set Command ..... 581
29.29.12 port vdsl rfiband Command ..... 582
29.29.13 port vdsl rficustom Commands ..... 582
29.29.14 port vdsl set Command ..... 583
29.29.15 port vdsl tls Commands ..... 583
29.29.16 port vdsl upbo Commands ..... 584
29.29.17 port vdsl vlan Commands ..... 584

**Chapter 30**
**profile Commands ..... 585**

30.1 Profiles Overview ..... 585
30.2 General profile Command Parameters ..... 585
30.3 profile Commands Summary ..... 586
30.4 profile acl Commands ..... 598
30.4.1 profile acl delete Command ..... 598
30.4.2 profile acl map Command ..... 598
30.4.3 profile acl set Command ..... 598
30.4.4 profile acl show Command ..... 600
30.5 profile adsl Commands ..... 600
30.5.1 profile adsl set Command ..... 600
30.5.2 profile adsl map Command ..... 602
30.5.3 profile adsl delete Command ..... 602

30.5.4 profile adsl show Command ..... 603
30.6 profile alarmadsl Commands ..... 603
30.6.1 profile alarmadsl show Command ..... 603
30.6.2 profile alarmadsl set Command ..... 604
30.6.3 profile alarmadsl delete Command ..... 605
30.6.4 profile alarmadsl map Command ..... 605
30.7 profile alarmshdsl Commands ..... 606
30.7.1 profile alarmshdsl show Command ..... 606
30.7.2 profile alarmshdsl set Command ..... 606
30.7.3 profile alarmshdsl delete Command ..... 607
30.7.4 profile alarmshdsl map Command ..... 607
30.8 profile alarmvdsl Commands ..... 608
30.8.1 profile alarmvdsl show Command ..... 608
30.8.2 profile alarmvdsl set Command ..... 608
30.8.3 profile alarmvdsl delete Command ..... 609
30.8.4 profile alarmvdsl map Command ..... 609
30.9 profile atm Commands ..... 610
30.9.1 profile atm show Command ..... 610
30.9.2 profile atm set Command ..... 610
30.9.3 profile atm delete Command ..... 612
30.9.4 profile atm map Command ..... 612
30.10 Profile Server ..... 612
30.11 profile ipqos Commands ..... 612
30.11.1 profile ipqos set Command ..... 613
30.11.2 profile ipqos show Command ..... 613
30.11.3 profile ipqos queue Command ..... 613
30.11.4 profile ipqos map Command ..... 614
30.11.5 profile ipqos delete Command ..... 615
30.12 profile profsvr Commands ..... 615
30.12.1 profile profsvr show Command ..... 615
30.12.2 profile profsvr mode Command ..... 615
30.12.3 profile profsvr clientlist set Command ..... 616
30.12.4 profile profsvr clientlist delete Command ..... 616
30.12.5 profile profsvr clientlist show Command ..... 616
30.12.6 profile profsvr serverset Command ..... 616
30.12.7 profile profsvr sync Command ..... 617
30.13 profile shdsl Commands ..... 617
30.13.1 profile shdsl set Command ..... 617
30.13.2 profile shdsl map Command ..... 618
30.13.3 profile shdsl delete Command ..... 618
30.13.4 profile shdsl show Command ..... 619
30.14 profile vdsl commands ..... 619
30.14.1 profile vdsl delete command ..... 619

30.14.2 profile vdsl map command ..... 620
30.14.3 profile vdsl set command ..... 620
30.14.4 profile vdsl show Command ..... 621
30.15 profile voip dsp Commands ..... 622
30.15.1 profile voip dsp delete Command ..... 622
30.15.2 profile voip dsp map Command ..... 622
30.15.3 profile voip dsp set Command ..... 623
30.15.4 profile voip dsp show Command ..... 624
30.16 profile voip h248 Commands ..... 625
30.16.1 profile voip h248 delete Command ..... 625
30.16.2 profile voip h248 map Command ..... 625
30.16.3 profile voip h248 set Command ..... 626
30.16.4 profile voip h248 show Command ..... 626
30.17 profile voip sip Commands ..... 626
30.17.1 profile voip sip delete Command ..... 627
30.17.2 profile voip sip map Command ..... 627
30.17.3 profile voip sip set Command ..... 627
30.17.4 profile voip sip show Command ..... 629
30.18 profile voip sip callsvc Commands ..... 629
30.18.1 profile voip sip callsvc delete Command ..... 629
30.18.2 profile voip sip callsvc map Command ..... 630
30.18.3 profile voip sip callsvc set Command ..... 630
30.18.4 profile voip sip callsvc show Command ..... 633
30.19 profile voip sip dialplan Commands ..... 634
30.19.1 profile voip sip dialplan delete Command ..... 634
30.19.2 profile voip sip dialplan map Command ..... 635
30.19.3 profile voip sip dialplan set Command ..... 635
30.19.4 profile voip sip dialplan show Command ..... 636

**Chapter 31**
**show Commands ..... 637**

31.1 show Commands Overview ..... 637
31.2 show Commands Summary ..... 637
31.3 show Commands ..... 640
31.3.1 show adsl Commands ..... 640
31.3.2 show arp Command ..... 645
31.3.3 show atm Command ..... 645
31.3.4 show cfm Command ..... 646
31.3.5 show dot3ad Command ..... 646
31.3.6 show dhcp counter Command ..... 647
31.3.7 show dhcp snoop Command ..... 647
31.3.8 show enet Command ..... 647
31.3.9 show gbond Command ..... 650

31.3.10 show igmp Commands ..... 650
31.3.11 show ip Command ..... 651
31.3.12 show ipbpvc arpproxy Command ..... 652
31.3.13 show ipbpvc interface Command ..... 653
31.3.14 show ipbpvc route Command ..... 653
31.3.15 show lineinfo Command ..... 654
31.3.16 show linerate Command ..... 656
31.3.17 show linestat Command ..... 657
31.3.18 show mac Command ..... 657
31.3.19 show monitor Command ..... 658
31.3.20 show mstp Command ..... 660
31.3.21 show packet Command ..... 661
31.3.22 show paepvc counter Command ..... 662
31.3.23 show paepvc session Command ..... 663
31.3.24 show performance Command ..... 663
31.3.25 show rmon Command ..... 665
31.3.26 show sys Command ..... 667
31.3.27 show user Command ..... 667
31.3.28 show vdsl linebandplan Command ..... 668
31.3.29 show vdsl linedata Command ..... 668
31.3.30 show vdsl linegain Command ..... 668
31.3.31 show vdsl linehlog Command ..... 669
31.3.32 show vdsl lineqln Command ..... 670
31.3.33 show vdsl linetssi Command ..... 671
31.3.34 show vlan Command ..... 672
31.3.35 show voip h248 mg Command ..... 672
31.3.36 show voip sip serverstate Command ..... 673

**Chapter 32**
**switch Commands ..... 675**

32.1 switch Commands Overview ..... 675
32.2 General switch Command Parameters ..... 675
32.3 switch Commands Summary ..... 675
32.4 switch bandwidth Commands ..... 680
32.4.1 switch bandwidth disable Command ..... 680
32.4.2 switch bandwidth enable Command ..... 680
32.4.3 switch bandwidth set Command ..... 681
32.4.4 switch bandwidth show Command ..... 681
32.5 switch bcasctrl Commands ..... 682
32.5.1 switch bcastctrl threshold Command ..... 682
32.5.2 switch bcastctrl show Command ..... 682
32.5.3 switch cfm Commands ..... 683
32.6 switch dot3ad Commands ..... 688

32.6.1 switch dot3ad lacp priority Command ..... 688
32.6.2 switch dot3ad lacp timeout Command ..... 689
32.6.3 switch dot3ad lacp show Command ..... 689
32.6.4 switch dot3ad enable Command ..... 689
32.6.5 switch dot3ad disable Command ..... 690
32.6.6 switch dot3ad show Command ..... 690
32.7 switch garptimer Commands ..... 690
32.7.1 switch garptimer show Command ..... 691
32.7.2 switch garptimer join Command ..... 691
32.7.3 switch garptimer leave Command ..... 691
32.7.4 switch garptimer leaveall Command ..... 692
32.7.5 switch garptimer set Command ..... 692
32.8 switch isolation Commands ..... 693
32.8.1 switch isolation show Command ..... 693
32.8.2 switch isolation enable Command ..... 693
32.8.3 switch isolation disable Command ..... 693
32.8.4 switch isolation vlan delete Command ..... 694
32.8.5 switch isolation vlan set Command ..... 694
32.9 switch mac aging Commands ..... 695
32.10 switch mstp Commands ..... 695
32.10.1 switch mstp cfgname Command ..... 695
32.10.2 switch mstp disable Command ..... 696
32.10.3 switch mstp enable Command ..... 696
32.10.4 switch mstp fwdelay Command ..... 696
32.10.5 switch mstp hellotime Command ..... 696
32.10.6 switch mstp maxage Command ..... 696
32.10.7 switch mstp maxhops Command ..... 697
32.10.8 switch mstp priority Command ..... 697
32.10.9 switch mstp revision Command ..... 697
32.10.10 switch mstp show Command ..... 698
32.10.11 switch mstp version Command ..... 698
32.10.12 switch mstp vlanmap Command ..... 699
32.11 switch port Commands ..... 699
32.11.1 switch port disable Command ..... 699
32.11.2 DSCP Overview ..... 699
32.11.3 switch port dscp Commands ..... 700
32.11.4 switch port enable Command ..... 701
32.11.5 switch port flowctrl disable Command ..... 701
32.11.6 switch port flowctrl enable Command ..... 702
32.11.7 switch port frametype Command ..... 702
32.11.8 switch port gvrp Commands ..... 702
32.11.9 switch port mode Command ..... 703
32.11.10 switch port mstp Commands ..... 703

32.11.11 switch port name Command ..... 705
32.11.12 switch port priority Command ..... 706
32.11.13 switch port pvid Command ..... 706
32.11.14 switch port show Command ..... 706
32.11.15 switch port speed Command ..... 707
32.12 switch port vlantrunk Commands ..... 707
32.12.1 switch port vlantrunk enable Command ..... 707
32.12.2 switch port vlantrunk disable Command ..... 708
32.13 switch qschedule Commands ..... 708
32.13.1 switch qschedule set Command ..... 708
32.13.2 switch qschedule show Command ..... 709
32.14 switch queuemap Commands ..... 709
32.14.1 switch queuemap set Command ..... 709
32.14.2 switch queuemap show Command ..... 709

**Chapter 33**
**sys Commands ..... 711**

33.1 sys Commands Overview ..... 711
33.2 sys Commands Summary ..... 711
33.3 sys Commands ..... 714
33.3.1 sys version Command ..... 714
33.3.2 sys baud set Command ..... 715
33.3.3 sys baud show Command ..... 715
33.3.4 sys client set Command ..... 715
33.3.5 sys client enable Command ..... 715
33.3.6 sys client disable Command ..... 716
33.3.7 sys client show Command ..... 716
33.3.8 sys time show Command ..... 716
33.3.9 sys time set Command ..... 716
33.3.10 sys date show Command ..... 717
33.3.11 sys date set Command ..... 717
33.3.12 sys timeserver show Command ..... 717
33.3.13 sys timeserver set Command ..... 717
33.3.14 sys timeserver sync Command ..... 718
33.3.15 sys info chassis Command ..... 718
33.3.16 sys info contact Command ..... 719
33.3.17 sys info frame Command ..... 719
33.3.18 sys info hostname Command ..... 719
33.3.19 sys info location Command ..... 720
33.3.20 sys info show Command ..... 720
33.3.21 sys monitor set Command ..... 721
33.3.22 sys monitor show command ..... 722
33.3.23 sys multilogin enable Command ..... 723

33.3.24 sys multilogin disable Command ..... 724
33.3.25 sys multilogin show Command ..... 724
33.3.26 sys reboot Command ..... 724
33.3.27 sys server port Command ..... 725
33.3.28 sys server disable Command ..... 725
33.3.29 sys server enable Command ..... 725
33.3.30 sys server show Command ..... 726
33.4 sys snmp Commands ..... 726
33.4.1 sys snmp getcommunity Command ..... 726
33.4.2 sys snmp setcommunity Command ..... 726
33.4.3 sys snmp trapcommunity Command ..... 727
33.4.4 sys snmp trapdst Command ..... 727
33.4.5 sys snmp show Command ..... 728
33.4.6 sys snmp user Command ..... 728
33.4.7 sys snmp version Command ..... 729
33.5 sys syslog Commands ..... 729
33.5.1 sys syslog server Command ..... 729
33.5.2 sys syslog enable Command ..... 729
33.5.3 sys syslog disable Command ..... 730
33.5.4 sys syslog show Command ..... 730
33.6 sys user Commands ..... 730
33.6.1 sys user auth Command ..... 730
33.6.2 sys user server Command ..... 731
33.6.3 sys user set Command ..... 732
33.6.4 sys user delete Command ..... 732
33.6.5 sys user enable Command ..... 732
33.6.6 sys user disable Command ..... 733
33.6.7 sys user show Command ..... 733
33.6.8 sys user online Command ..... 733

**Chapter 34**
**vlan Commands ..... 735**

34.1 vlan Commands Overview ..... 735
34.2 vlan Commands Summary ..... 735
34.3 vlan Commands ..... 735
34.3.1 vlan delete Command ..... 735
34.3.2 vlan disable Command ..... 736
34.3.3 vlan enable Command ..... 736
34.3.4 vlan name Command ..... 736
34.3.5 vlan set Command ..... 736
34.3.6 vlan show Command ..... 737

**Chapter 35**
**voip Commands ..... 739**

35.1 voip Commands Summary ..... 739
35.2 voip arp Commands ..... 742
35.2.1 voip arp flush Command ..... 743
35.2.2 voip arp show Command ..... 743
35.3 voip countrycode Commands ..... 743
35.3.1 voip countrycode set Command ..... 743
35.3.2 voip countrycode show Command ..... 744
35.4 voip h248 mg Commands ..... 746
35.4.1 voip h248 mg set Command ..... 746
35.4.2 voip h248 mg enable Command ..... 746
35.4.3 voip h248 map Command ..... 746
35.4.4 voip h248 show Command ..... 747
35.4.5 voip h248 disable Command ..... 747
35.4.6 voip h248 delete Command ..... 747
35.5 Voip ip Commands ..... 747
35.5.1 voip ip set Command ..... 747
35.5.2 voip ip dns Command ..... 748
35.5.3 voip ip show Command ..... 748
35.6 voip route Commands ..... 748
35.6.1 voip route delete Command ..... 748
35.6.2 voip route set Command ..... 749
35.6.3 voip route show Command ..... 749
35.7 voip sip dialplan ..... 750
35.7.1 voip sip dialplan delete Command ..... 750
35.7.2 voip sip dialplan map Command ..... 750
35.7.3 voip sip dialplan set Command ..... 750
35.7.4 voip sip dialplan show Command ..... 751
35.8 voip sip keypattern Commands ..... 752
35.8.1 voip sip keypattern set Command ..... 752
35.8.2 voip sip keypattern show Command ..... 752
35.9 voip sip localhelp Commands ..... 754
35.9.1 voip sip localhelp delete Command ..... 754
35.9.2 voip sip localhelp map Command ..... 754
35.9.3 voip sip localhelp set Command ..... 755
35.9.4 voip sip localhelp show Command ..... 755
35.10 voip sip numberplan Commands ..... 755
35.10.1 voip sip numberplan delete Command ..... 755
35.10.2 voip sip numberplan map Command ..... 756
35.10.3 voip sip numberplan set Command ..... 756

**Chapter 36**
**Firmware and Configuration File Maintenance ..... 759**

36.1 Firmware and Configuration File Maintenance Overview ..... 759

36.2 Filename Conventions ..... 759
36.3 Editable Configuration File ..... 760
36.3.1 Editable Configuration File Backup ..... 760
36.3.2 Edit Configuration File ..... 761
36.3.3 Editable Configuration File Upload ..... 761
36.4 Firmware File Upgrade ..... 762
36.5 Configuration File Upgrade ..... 763

**Part IV: Troubleshooting and Product Specifications ..... 765**

**Chapter 37
Troubleshooting ..... 767**

37.1 Power, Hardware Connections, and LEDs ..... 767
37.2 MSC1000G Access and Login ..... 768
37.3 Data Transmission ..... 771
37.4 Redundant Management Switch Cards ..... 771
37.5 Management Lockout ..... 771
37.6 A Line Card Does Not Become Active ..... 772
37.7 Resetting the Defaults ..... 772
37.7.1 Resetting the Defaults Via CLI Command ..... 772
37.7.2 Recovering the Firmware ..... 773

**Chapter 38
Product Specifications ..... 775**

38.1 IES-5000 Default Settings ..... 775
38.2 Specifications ..... 778
38.3 Features ..... 779
38.4 Firmware Naming Conventions ..... 783
38.5 Console Port Pin Assignments ..... 783
38.6 ALARM Connector Pin Assignments ..... 784

**Part V: Appendices and Index ..... 787**

Appendix A PSTN Parameters by Country ..... 789

Appendix B Legal Information ..... 861

Appendix C Customer Support ..... 865

**Index ..... 871**

# List of Tables

Table 1 Management Switch Card LED Descriptions ..... 65
Table 2 Front Panel Descriptions ..... 66
Table 3 Navigation Panel Links ..... 74
Table 4 Web Configurator Screen Sub-links Details ..... 79
Table 5 System Info (Home) ..... 83
Table 6 System Info: Slot ..... 84
Table 7 DHCP Relay Agent Circuit ID Sub-option Format: Private ..... 92
Table 8 DHCP Relay Agent Remote ID Sub-option Format: Private ..... 92
Table 9 DHCP Relay Agent Circuit ID Sub-option Format: TR-101 (VID on) ..... 92
Table 10 DHCP Relay Agent Circuit ID Sub-option Format: TR-101 (VID off) ..... 92
Table 11 PPPoE Intermediate Agent Vendor-specific Tag Format ..... 93
Table 12 PPPoE Intermediate Agent Vendor-specific Tag Format ..... 93
Table 13 PPPoE Intermediate Agent Remote ID Sub-option Format ..... 93
Table 14 DHCP Relay ..... 94
Table 15 DHCP Snooping ..... 98
Table 16 DHCP Snooping: Slot ..... 100
Table 17 Downstream Broadcast ..... 102
Table 18 Downstream Broadcast: Slot ..... 104
Table 19 MAC Count ..... 105
Table 20 MAC Count: Slot ..... 107
Table 21 MAC Filter ..... 108
Table 22 MAC Filter: Slot ..... 109
Table 23 OUI Filter ..... 111
Table 24 OUI Filter: Slot ..... 112
Table 25 Packet Filter ..... 113
Table 26 Packet Filter: Slot ..... 116
Table 27 802.1X PNAC: Port Setup ..... 118
Table 28 802.1X PNAC: Port Setup: Slot ..... 120
Table 29 802.1X PNAC: RADIUS ..... 121
Table 30 ACL > Upstream Broadcast ..... 122
Table 31 ACL > Rule ..... 123
Table 32 ACL > AntiMacspoof ..... 124
Table 33 ACL > DSCP > Setup ..... 125
Table 34 ACL > DSCP > Port ..... 126
Table 35 DSCP > Port: Slot ..... 128
Table 36 ACL > PPPoE ..... 129
Table 37 Current Alarm: All ..... 131
Table 38 History Alarm: All ..... 132

Table 39 Alarm Port Setup ..... 134
Table 40 Alarm Port Setup: Slot ..... 136
Table 41 Alarm Severity Assignment: DSL ..... 137
Table 42 Alarm Descriptions ..... 138
Table 43 Alarm Clear ..... 143
Table 44 Alarm > Alarm Input ..... 144
Table 45 ZyXEL Cluster Management Specifications ..... 145
Table 46 Cluster: Status ..... 146
Table 47 Cluster: Configuration ..... 148
Table 48 Cluster Member Web Configurator Screen ..... 150
Table 49 LDM Test ..... 153
Table 50 Loop Diagnostics Test Parameters ..... 154
Table 51 Loopback ..... 155
Table 52 IP Ping ..... 156
Table 53 Trace Route ..... 156
Table 54 Diagnostic > MLT Screen ..... 157
Table 55 CFM Loopback ..... 159
Table 56 Diagnostic > CFM Linktrace ..... 159
Table 57 Diagnostic > SELT ..... 161
Table 58 IGMP Setup ..... 170
Table 59 IGMP Port Setup ..... 171
Table 60 Multicast > IGMP > Bandwidth ..... 173
Table 61 Static Multicast ..... 174
Table 62 Static Multicast Slot ..... 176
Table 63 MVLAN Setup ..... 177
Table 64 MVLAN Port Setting ..... 178
Table 65 MVLAN Group Setup ..... 179
Table 66 ADSL Standards Maximum Transfer Rates ..... 181
Table 67 Optional band PSD Mask ..... 182
Table 68 Supported VDSL2 Profiles (Annex A) ..... 182
Table 69 Real Length to Electrical Length ..... 185
Table 70 ADSL Port Setup ..... 187
Table 71 ADSL Port Setup: Line Card ..... 189
Table 72 ADSL Port Setup: Advanced ..... 191
Table 73 ADSL Port Setup: Advanced: Option Mask ..... 194
Table 74 VDSL Port Setup ..... 196
Table 75 VDSL Port Setup: Line Card ..... 199
Table 76 VDSL Port Setup: Advanced ..... 200
Table 77 VDSL Port Setup: Advanced ..... 205
Table 78 VDSL2 Limit Mask profiles ..... 206
Table 79 VDSL Port Setup: Advanced: Optionmask ..... 207
Table 80 ADSL Port Setup: Advanced: Option Mask ..... 209
Table 81 VLAN Tag Format ..... 210

Table 82 Single and Double Tagged 802.1Q Frame Format ....211
Table 83 802.1Q Frame ....211
Table 84 VDSL Port Setup: VLAN Setup ....212
Table 85 VDSL Port Setup: PVLAN Setup ....214
Table 86 SHDSL Port Setup ....215
Table 87 SHDSL Port Setup: Line Card ....218
Table 88 SHDSL Port Setup: Advanced ....219
Table 89 PVC Setup ....222
Table 90 PVC Setup: Slot ....224
Table 91 PVC Setup: VLAN ....225
Table 92 PVC Setup: PVLAN ....227
Table 93 Port Copy ....228
Table 94 IP Bridge: Layer-2 Header for Upstream Traffic ....230
Table 95 IPB ARP Proxy ....233
Table 96 IPB Domain ....234
Table 97 IPB Edgerouter ....236
Table 98 IPB Interface ....237
Table 99 IPBPVC ....239
Table 100 IPBPVC: VLAN Setup ....241
Table 101 IPBPVC: Slot ....242
Table 102 IPB Route ....244
Table 103 Port > G.bond ....247
Table 104 Port > VoIP SIP Setup Screen ....249
Table 105 The Port > VoIP SIP Setup > SIP Port Setup Line Card Screen ....252
Table 106 The Advanced Port SIP Setup Screen ....253
Table 107 The Port > VoIP H248 Screen ....255
Table 108 The Port > VoIP H248 Setup > H248 Port Setup Line Card Screen ....257
Table 109 The Advanced H248 Port Setup Screen ....258
Table 110 ENET Port Setup ....260
Table 111 ENET Port Setup: Line Card ....262
Table 112 ENET Port Setup: VLAN Setup ....263
Table 113 ADSL Profile ....267
Table 114 VDSL Profile ....270
Table 115 SHDSL Profile ....273
Table 116 ATM Profile ....277
Table 117 Alarm ADSL Profile ....279
Table 118 Alarm VDSL Profile ....281
Table 119 Alarm SHDSL Profile ....283
Table 120 IGMP Filter Profile ....284
Table 121 Profile > VoIP SIP Screen ....285
Table 122 Profile > VoIP SIP CALLSVC Screen ....287
Table 123 The Profile > VoIP DSP Screen ....291
Table 124 Profile VoIP H248 Screen ....293

Table 125 Profile > Dialplan ..... 295
Table 126 ACL Profile Setup ..... 299
Table 127 ARP Table ..... 302
Table 128 DHCP Statistics ..... 303
Table 129 MAC Table ..... 305
Table 130 IGMP Status ..... 306
Table 131 IGMP Status: Port Status ..... 307
Table 132 IP Bridge ARP Proxy ..... 307
Table 133 IP Bridge Interfaces ..... 308
Table 134 IP Bridge Routes ..... 309
Table 135 Online Users ..... 310
Table 136 Port Statistics ..... 311
Table 137 MSC Port Statistics: ENET ..... 312
Table 138 MSC Port Statistics: ENET Details ..... 313
Table 139 MSC Port Statistics: ENET: RMON ..... 315
Table 140 Port Statistics: ENET: RMON History ..... 317
Table 141 Port Statistics: DSL Line Card ..... 318
Table 142 Port Statistics: DSL Line Card: Packet Counter ..... 319
Table 143 Port Statistics: DSL Line Card: Cell Counter ..... 320
Table 144 Port Statistics: DSL Line Card: Line Detail ..... 322
Table 145 Port Statistics: DSL Line Card: Line Performance: Current ..... 324
Table 146 Port Statistics: DSL Line Card: Line Performance: 15Min ..... 326
Table 147 Port Statistics: DSL Line Card: Status ..... 329
Table 148 ELC Port Statistics ..... 330
Table 149 ELC Port Statistics Details ..... 331
Table 150 VOP Port Statistics ..... 332
Table 151 VOP Port Statistics Details ..... 333
Table 152 Dot3ad ..... 335
Table 153 VLAN Statistics ..... 335
Table 154 VLAN: Port Status ..... 336
Table 155 MSTP Statistics: CIST ..... 337
Table 156 MSTP Statistics: CIST: Port Details ..... 339
Table 157 MSTP Statistics: MSTI ..... 340
Table 158 IP Statistics ..... 341
Table 159 IP Statistics ..... 342
Table 160 CFM Statistics ..... 343
Table 161 H248 Statistics ..... 344
Table 162 Proxy Server Statistics ..... 344
Table 163 Link Aggregation ID: Local Switch ..... 346
Table 164 Link Aggregation ID: Peer Switch ..... 346
Table 165 Physical Queue Priority ..... 346
Table 166 Switch Setup General ..... 348
Table 167 Switch Setup Dot3ad ..... 349

Table 168 Switch Setup QSchedule ..... 350
Table 169 Switch Setup Isolation ..... 351
Table 170 STP Path Costs ..... 352
Table 171 MSTP/RSTP Path Costs ..... 352
Table 172 RSTP and STP Port States ..... 354
Table 173 MSTP: Bridge ..... 357
Table 174 MSTP: Port ..... 359
Table 175 Switch Port Setup ..... 364
Table 176 Switch Port Setup: 802.1P/1Q ..... 365
Table 177 Switch Port Setup: Bandwidth ..... 366
Table 178 Switch Port Setup: Broadcast ..... 367
Table 179 Switch Port Setup: DSCP ..... 368
Table 180 CFM Maintenance Domain ..... 369
Table 181 CFM Maintenance Association ..... 370
Table 182 CFM Endpoint: MEP ..... 372
Table 183 CFM Endpoint: MIP ..... 374
Table 184 CFM Endpoint: MIP > Slot ..... 375
Table 185 Switch CFM > LBR ..... 376
Table 186 Switch CFM > LBR > Slot ..... 377
Table 187 SNMP Commands ..... 380
Table 188 Access Control: SNMP ..... 381
Table 189 Access Control: Service Access Control ..... 383
Table 190 Access Control: Secured Client ..... 383
Table 191 General Setup ..... 384
Table 192 IP Setup ..... 386
Table 193 Unix Syslog ..... 387
Table 194 User Account ..... 388
Table 195 Service Type to Privilege Level Mapping ..... 389
Table 196 User Account Authentication ..... 390
Table 197 Sys > Monitor ..... 391
Table 198 IEEE 802.1Q VLAN Terminology ..... 397
Table 199 VLAN Setup ..... 398
Table 200 VLAN Port Setting ..... 400
Table 201 VLAN Port Setting Slot ..... 401
Table 202 VLAN Port Setting Slot Detail ..... 401
Table 203 SIP Call Progression ..... 406
Table 204 H.248/MEGACO Commands ..... 410
Table 205 H.248/MEGACO Call Procedure Example ..... 411
Table 206 Using Call Services ..... 415
Table 207 The VoIP > ARP Screen ..... 418
Table 208 The VoIP > Countrycode Screen ..... 419
Table 209 The VoIP > Countrycode > Detail Screen ..... 421
Table 210 The VoIP > IP Screen ..... 422

Table 211 The VoIP > Route Screen ..... 423
Table 212 The VoIP > Number Plan Screen ..... 425
Table 213 The VoIP > H248 Screen ..... 426
Table 214 The VoIP > Local Help Screen ..... 428
Table 215 The VoIP > Key Pattern Screen ..... 430
Table 216 VoIP > Dialplan Screen ..... 431
Table 217 VoIP > Localcall ..... 433
Table 218 Config Save ..... 435
Table 219 Common Command Notation ..... 441
Table 220 acl Commands ..... 443
Table 221 General alarm Command Parameters ..... 471
Table 222 alarm Commands ..... 471
Table 223 clear Commands ..... 479
Table 224 General cluster Command Parameters ..... 481
Table 225 cluster Commands ..... 481
Table 226 FTP Upload to a Cluster Member Example ..... 486
Table 227 config Commands ..... 487
Table 228 CFM Terms and Definitions ..... 489
Table 229 General diagnostic Command Parameters ..... 490
Table 230 diagnostic Commands ..... 490
Table 231 ip Commands ..... 499
Table 232 lcman Commands ..... 505
Table 233 lcman show Command ..... 507
Table 234 lcman show Command: Detailed Information ..... 508
Table 235 multicast Commands ..... 509
Table 236 General port Command Parameters ..... 525
Table 237 port Commands ..... 526
Table 238 General profile Command Parameters ..... 585
Table 239 profile Commands ..... 586
Table 240 show Commands ..... 637
Table 241 show adsl tssi Command Display ..... 642
Table 242 show adsl tssi Command Display ..... 642
Table 243 show adsl lineqln Command Display ..... 643
Table 244 show adsl tssi Command Display ..... 645
Table 245 show atm Command Display ..... 646
Table 246 show enet Command Display ..... 648
Table 247 IPB ARP Proxy Show Command Output ..... 653
Table 248 show lineinfo Command Display ..... 655
Table 249 show lineinfo Command Display (VoIP) ..... 656
Table 250 Line Rate Information ..... 656
Table 251 show monitor Command Information ..... 660
Table 252 show paepvc counter Command Fields ..... 662
Table 253 show performance curr ..... 664

Table 254 show performance 1day ..... 665
Table 255 show vdsl lineqln Command Display ..... 670
Table 256 show vdsl tssi Command Display ..... 672
Table 257 General switch Command Parameters ..... 675
Table 258 switch Commands ..... 675
Table 259 sys Commands ..... 711
Table 260 Multiple Login Overview ..... 723
Table 261 vlan Commands ..... 735
Table 262 voip Commands ..... 739
Table 263 File Name Conventions ..... 760
Table 264 Default Settings ..... 775
Table 265 MSC1000G Specifications ..... 778
Table 266 IES-5000 Features ..... 779
Table 267 Supported Standards ..... 782
Table 268 Console Port Pin Assignments ..... 784
Table 269 ALARM Connector Pin Assignments ..... 784

# List of Figures

Figure 1 MTU Application ..... 56
Figure 2 Central Office Application ..... 57
Figure 3 MSC1000G Front Panel ..... 65
Figure 4 ALARM Connector Pin Layout ..... 67
Figure 5 Transceiver Installation ..... 69
Figure 6 Installed Transceiver ..... 69
Figure 7 Opening the Transceiver Latch ..... 69
Figure 8 Removing the Transceiver ..... 70
Figure 9 Web Configurator: Login ..... 73
Figure 10 Web Configurator: First Screen ..... 74
Figure 11 Web Configurator: Save Configuration on Logout ..... 82
Figure 12 Web Configurator: Logout Screen ..... 82
Figure 13 Web Configurator: Home Screen (System Info) ..... 83
Figure 14 System Info: Slot ..... 84
Figure 15 Sys: IP Setup Menu ..... 85
Figure 16 IP Setup ..... 86
Figure 17 Subscriber Connection Test ..... 86
Figure 18 Enable the VDSL Port ..... 87
Figure 19 H.248 Profile Example ..... 88
Figure 20 Virtual MG Example ..... 88
Figure 21 Port Setup Example ..... 89
Figure 22 DHCP Relay ..... 94
Figure 23 DHCP Relay Network Example ..... 96
Figure 24 DHCP Relay: Configuration Example ..... 96
Figure 25 DHCP Snooping Network Example ..... 97
Figure 26 DHCP Snooping ..... 98
Figure 27 DHCP Snooping: Slot ..... 100
Figure 28 DHCP Snooping: Computer A Example ..... 101
Figure 29 DHCP Snooping: Computer B Example ..... 101
Figure 30 Downstream Broadcast ..... 102
Figure 31 Downstream Broadcast: Slot ..... 104
Figure 32 MAC Count ..... 105
Figure 33 MAC Count: Slot ..... 107
Figure 34 MAC Filter ..... 108
Figure 35 MAC Filter: Slot ..... 109
Figure 36 OUI Filter ..... 110
Figure 37 OUI Filter: Slot ..... 112
Figure 38 Packet Filter ..... 113

Figure 39 Packet Filter: Slot ..... 115
Figure 40 RADIUS Server ..... 117
Figure 41 802.1X PNAC: Port Setup ..... 118
Figure 42 802.1X PNAC: Port Setup: Slot ..... 120
Figure 43 802.1X PNAC: RADIUS ..... 121
Figure 44 ACL > Upstream Broadcast ..... 122
Figure 45 ACL > Rule ..... 122
Figure 46 ACL > AntiMacspoof ..... 124
Figure 47 ACL > DSCP > Setup ..... 125
Figure 48 ACL > DSCP > Port ..... 126
Figure 49 DSCP > Port: Slot ..... 128
Figure 50 ACL > PPPoE ..... 129
Figure 51 Current Alarm: All ..... 131
Figure 52 History Alarm: All ..... 132
Figure 53 Alarm Port Setup ..... 133
Figure 54 Alarm Port Setup: Slot ..... 135
Figure 55 Alarm Severity Assignment: DSL ..... 137
Figure 56 Alarm Clear ..... 143
Figure 57 Alarm > Alarm Input ..... 143
Figure 58 Clustering Application Example ..... 145
Figure 59 Cluster: Status ..... 146
Figure 60 Cluster: Configuration ..... 147
Figure 61 Cluster Member Web Configurator Screen ..... 149
Figure 62 Management for any Fault in Bridges ..... 151
Figure 63 MIP and MEP Example ..... 152
Figure 64 LDM Test ..... 153
Figure 65 Loopback ..... 155
Figure 66 IP Ping ..... 155
Figure 67 Trace Route ..... 156
Figure 68 Diagnostic > MLT Screen ..... 157
Figure 69 CFM Loopback ..... 158
Figure 70 Diagnostic > CFM Linktrace ..... 159
Figure 71 Diagnostic > SELT ..... 160
Figure 72 Configuration Backup ..... 163
Figure 73 Configuration Restore ..... 164
Figure 74 Configuration Reset ..... 164
Figure 75 Confirm Restore Factory Default Settings ..... 164
Figure 76 Restart After Load Factory Defaults ..... 165
Figure 77 FW Upgrade ..... 165
Figure 78 Reboot ..... 166
Figure 79 Confirm Restart ..... 166
Figure 80 Rebooting ..... 166
Figure 81 IGMP Proxy Network Example ..... 168

Figure 82 IGMP Setup ..... 169
Figure 83 Multicast > IGMP > Port Setup ..... 171
Figure 84 IGMP Port Setup: Copy ..... 172
Figure 85 Multicast > IGMP > Bandwidth ..... 173
Figure 86 Static Multicast ..... 174
Figure 87 Static Multicast Slot ..... 175
Figure 88 MVLAN Setup ..... 176
Figure 89 MVLAN Port Setting ..... 178
Figure 90 MVLAN Group Setup ..... 179
Figure 91 A Band Plan Example ..... 182
Figure 92 UPBO Resolves Upstream Far-End Crosstalk ..... 183
Figure 93 DPBO Resolves Downstream Far-End Crosstalk ..... 184
Figure 94 ADSL Port Setup ..... 187
Figure 95 Copy ..... 188
Figure 96 ADSL Port Setup: Line Card ..... 189
Figure 97 Copy ..... 189
Figure 98 ADSL Port Setup: Advanced ..... 191
Figure 99 ADSL Port Setup: Advanced: Option Mask ..... 194
Figure 100 VDSL Port Setup ..... 196
Figure 101 Copy ..... 197
Figure 102 VDSL Port Setup: Line Card ..... 198
Figure 103 Copy ..... 199
Figure 104 VDSL Port Setup: Advanced ..... 200
Figure 105 Result Mask ..... 204
Figure 106 VDSL Port Setup: Advanced (ctd.) ..... 205
Figure 107 VDSL Port Setup: Advanced: Optionmask ..... 207
Figure 108 PSD Chart Parameter ..... 209
Figure 109 VLAN Stacking Example ..... 210
Figure 110 VDSL VLAN Setup ..... 212
Figure 111 VDSL PVLAN Setup ..... 213
Figure 112 SHDSL Port Setup ..... 215
Figure 113 Copy ..... 216
Figure 114 SHDSL Port Setup: Line Card ..... 217
Figure 115 Copy ..... 218
Figure 116 SHDSL Port Setup: Advanced ..... 219
Figure 117 PVC Setup ..... 222
Figure 118 Copy ..... 223
Figure 119 PVC Setup: Slot ..... 224
Figure 120 PVC Setup: VLAN ..... 225
Figure 121 PVC Setup: PVLAN ..... 226
Figure 122 Port Copy ..... 228
Figure 123 Copy ..... 228
Figure 124 IP Bridge: Traditional vs. IP-aware DSLAM ..... 229

Figure 125 IP Bridge: Upstream Traffic Example ..... 230
Figure 126 IPB ARP Proxy ..... 233
Figure 127 IPB Domain ..... 234
Figure 128 IPB Edgerouter ..... 236
Figure 129 IPB Interface ..... 237
Figure 130 IPBPVC ..... 239
Figure 131 IPBPVC: VLAN Setup ..... 241
Figure 132 IPBPVC: Slot ..... 242
Figure 133 IPB Route ..... 243
Figure 134 ADSL Pair Bonding Example ..... 245
Figure 135 SHDSL Pair Bonding Example ..... 246
Figure 136 Port > G.bond ..... 247
Figure 137 Port > VoIP SIP Screen ..... 249
Figure 138 Copy Port Settings ..... 250
Figure 139 The Port > VoIP SIP Setup > SIP Port Setup Line Card Screen ..... 251
Figure 140 Copy Port Settings ..... 252
Figure 141 The Advanced Port SIP Setup Screen ..... 253
Figure 142 The Port > VoIP H248 Screen ..... 255
Figure 143 Copy Port Settings ..... 256
Figure 144 The Port > VoIP H248 Setup > H248 Port Setup Line Card Screen ..... 257
Figure 145 Copy Port Settings ..... 257
Figure 146 The Advanced H248 Port Setup Screen ..... 258
Figure 147 ENET Port Setup ..... 259
Figure 148 Copy ..... 261
Figure 149 ENET Port Setup: Line Card ..... 262
Figure 150 Copy ..... 262
Figure 151 ENET VLAN Setup ..... 263
Figure 152 ADSL Profile ..... 267
Figure 153 VDSL Profile ..... 270
Figure 154 SHDSL Profile ..... 273
Figure 155 PCR, SCR and MBS in Traffic Shaping ..... 276
Figure 156 TAT, CDVT and BT in Traffic Shaping ..... 277
Figure 157 ATM Profile ..... 277
Figure 158 Alarm ADSL Profile ..... 279
Figure 159 Alarm VDSL Profile ..... 281
Figure 160 Alarm SHDSL Profile ..... 282
Figure 161 IGMP Filter Profile ..... 284
Figure 162 Profile > VoIP SIP Screen ..... 285
Figure 163 Profile > VoIP SIP CALLSVC Screen ..... 287
Figure 164 The Profile > VoIP DSP Screen ..... 291
Figure 165 Profile VoIP H248 Screen ..... 293
Figure 166 Profile > Dialplan ..... 295
Figure 167 Profile > IPQoS ..... 296

Figure 168 Profile > IPQoS ..... 296
Figure 169 ACL Profile Setup ..... 299
Figure 170 ARP Table ..... 302
Figure 171 DHCP Statistics ..... 302
Figure 172 MAC Table Filtering Flowchart ..... 304
Figure 173 MAC Table ..... 304
Figure 174 IGMP Status ..... 305
Figure 175 IGMP Status: Port Status ..... 306
Figure 176 IP Bridge ARP Proxy ..... 307
Figure 177 IP Bridge Interfaces ..... 308
Figure 178 IP Bridge Routes ..... 309
Figure 179 Online Users ..... 310
Figure 180 Port Statistics ..... 311
Figure 181 MSC Port Statistics: ENET ..... 312
Figure 182 MSC Port Statistics: ENET Details ..... 313
Figure 183 MSC Port Statistics: ENET: RMON ..... 315
Figure 184 Port Statistics: ENET: RMON History ..... 316
Figure 185 Port Statistics: ENET: RMON History: Detail ..... 317
Figure 186 Port Statistics: DSL Line Card ..... 318
Figure 187 Port Statistics: DSL Line Card: Packet Counter ..... 319
Figure 188 Port Statistics: DSL Line Card: Cell Counter ..... 320
Figure 189 Port Statistics: DSL Line Card: Line Detail ..... 321
Figure 190 Port Statistics: DSL Line Card: Line Performance: Current ..... 324
Figure 191 Port Statistics: DSL Line Card: Line Performance: 15Min ..... 326
Figure 192 Port Statistics: DSL Line Card: Line Performance: 1day ..... 328
Figure 193 Port Statistics: DSL Line Card: Status ..... 329
Figure 194 ELC Port Statistics ..... 330
Figure 195 ELC Port Statistics Details ..... 330
Figure 196 VOP Port Statistics ..... 331
Figure 197 VOP Port Statistics Details ..... 333
Figure 198 Dot3ad ..... 335
Figure 199 VLAN Statistics ..... 335
Figure 200 VLAN: Port Status ..... 336
Figure 201 MSTP Statistics: CIST ..... 337
Figure 202 MSTP Statistics: CIST: Port Details ..... 338
Figure 203 MSTP Statistics: MSTI ..... 340
Figure 204 IP Statistics ..... 341
Figure 205 G.bond Statistics ..... 342
Figure 206 CFM Statistics ..... 343
Figure 207 H248 Statistics ..... 343
Figure 208 Proxy Server Statistics ..... 344
Figure 209 Switch Setup General ..... 347
Figure 210 Switch Setup Dot3ad ..... 349

Figure 211 Switch Setup QSchedule ..... 350
Figure 212 Switch Setup Isolation ..... 351
Figure 213 STP Root Ports and Designated Ports ..... 353
Figure 214 STP/RSTP Network Example ..... 355
Figure 215 MSTP Network Example ..... 355
Figure 216 MSTIs in Different Regions ..... 356
Figure 217 MSTP and Legacy RSTP Network Example ..... 356
Figure 218 MSTP: Bridge ..... 357
Figure 219 MSTP: Port ..... 359
Figure 220 MSTP Network Example 2 ..... 360
Figure 221 MSTP Configuration Example: Bridge ..... 361
Figure 222 MSTP Configuration Example: Port ..... 362
Figure 223 Port VLAN Trunking ..... 363
Figure 224 Switch Port Setup ..... 364
Figure 225 Switch Port Setup: 802.1P/1Q ..... 365
Figure 226 Switch Port Setup: Bandwidth ..... 366
Figure 227 Switch Port Setup: Broadcast ..... 366
Figure 228 Switch Port Setup: DSCP ..... 368
Figure 229 Switch CFM ..... 369
Figure 230 CFM Maintenance Association ..... 370
Figure 231 CFM Endpoint: MEP ..... 372
Figure 232 CFM Endpoint: MIP ..... 373
Figure 233 CFM Endpoint: MIP > Slot ..... 375
Figure 234 Switch CFM > LBR ..... 376
Figure 235 Switch CFM > LBR > Slot ..... 377
Figure 236 SNMP Management Model ..... 379
Figure 237 Access Control: SNMP ..... 381
Figure 238 Access Control: Service Access Control ..... 382
Figure 239 Access Control: Secured Client ..... 383
Figure 240 General Setup ..... 384
Figure 241 IP Setup ..... 386
Figure 242 Unix Syslog ..... 387
Figure 243 User Account ..... 388
Figure 244 User Account Authentication ..... 389
Figure 245 Sys > Monitor ..... 391
Figure 246 VLAN Setup ..... 398
Figure 247 VLAN Port Setting ..... 400
Figure 248 VLAN Port Setting Slot ..... 401
Figure 249 VLAN Port Setting Slot Detail ..... 401
Figure 250 SIP Proxy Server ..... 405
Figure 251 SIP Call Through Proxy Servers ..... 406
Figure 252 SIP and H.248 Network Comparison ..... 408
Figure 253 H.248 Connection Example ..... 409

Figure 254 H.248 Call Waiting Example ..... 409
Figure 255 H.248/MEGACO Call Procedure Example ..... 411
Figure 256 Multiple Media Gateway Profiles Example ..... 413
Figure 257 The VoIP > ARP Screen ..... 418
Figure 258 The VoIP > Countrycode Screen ..... 419
Figure 259 The VoiP > Countrycode > Detail Screen ..... 421
Figure 260 The VoIP > IP Screen ..... 422
Figure 261 The VoIP > Route Screen ..... 423
Figure 262 The VoIP > Number Plan Screen ..... 424
Figure 263 The VoIP > H248 Screen ..... 426
Figure 264 The VoIP > Local Help Screen ..... 428
Figure 265 The VoIP > Key Pattern Screen. ..... 429
Figure 266 VoIP > Dialplan Screen ..... 431
Figure 267 VoIP > Localcall ..... 432
Figure 268 Config Save ..... 435
Figure 269 FTP Upload to a Cluster Member Example ..... 486
Figure 270 Mixed PPPoA-to-PPPoE Broadband Network Example ..... 564
Figure 271 Example Xmodem Upload ..... 773
Figure 272 Console Port Pin Layout ..... 784
Figure 273 ALARM Connector Pin Layout ..... 784

# PART I
# Introduction

Getting to Know Your MSC1000G (55)
Hardware Connections (65)

# 1

# Getting to Know Your MSC1000G

This chapter introduces the main applications of the MSC1000G. It also introduces the ways you can manage the MSC1000G.

## 1.1 Introduction

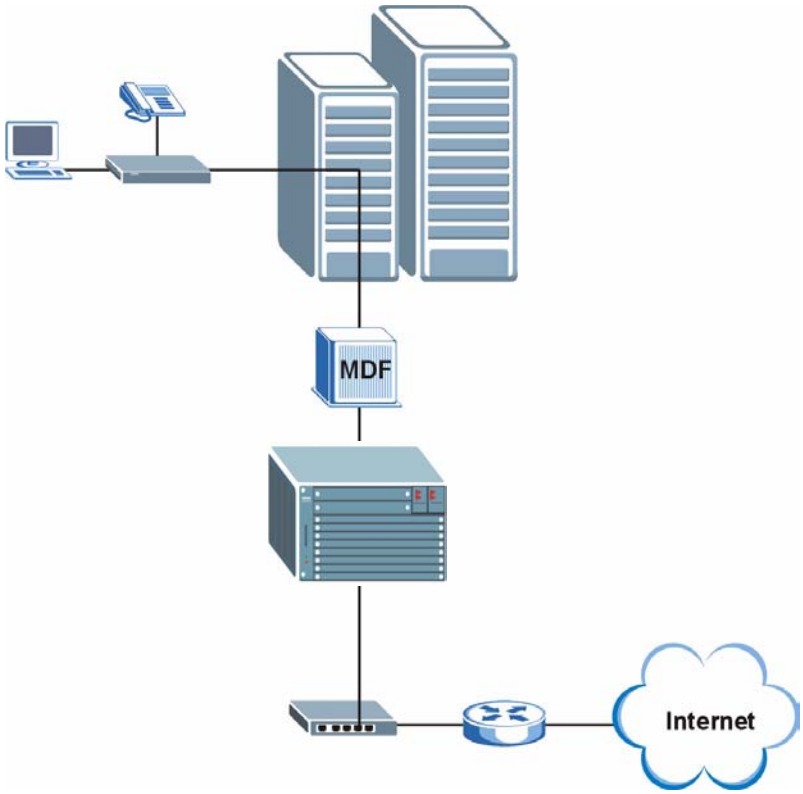
The IES-5000 series is perfect for ISPs or large building applications seeking to provide high bandwidth broadband services to subscribers while minimizing costs.

The MSC1000G (Management Switch Card Gigabit) centralizes the management of all of the Integrated Ethernet Switch's line cards. You can configure and maintain the line cards through the management switch card; thus eliminating the need to connect to each line card individually. It also provides Gigabit ports and slots for connecting to other Ethernet switches. See Chapter 38 on page 775 for a complete list of features.

### 1.1.1 Applications

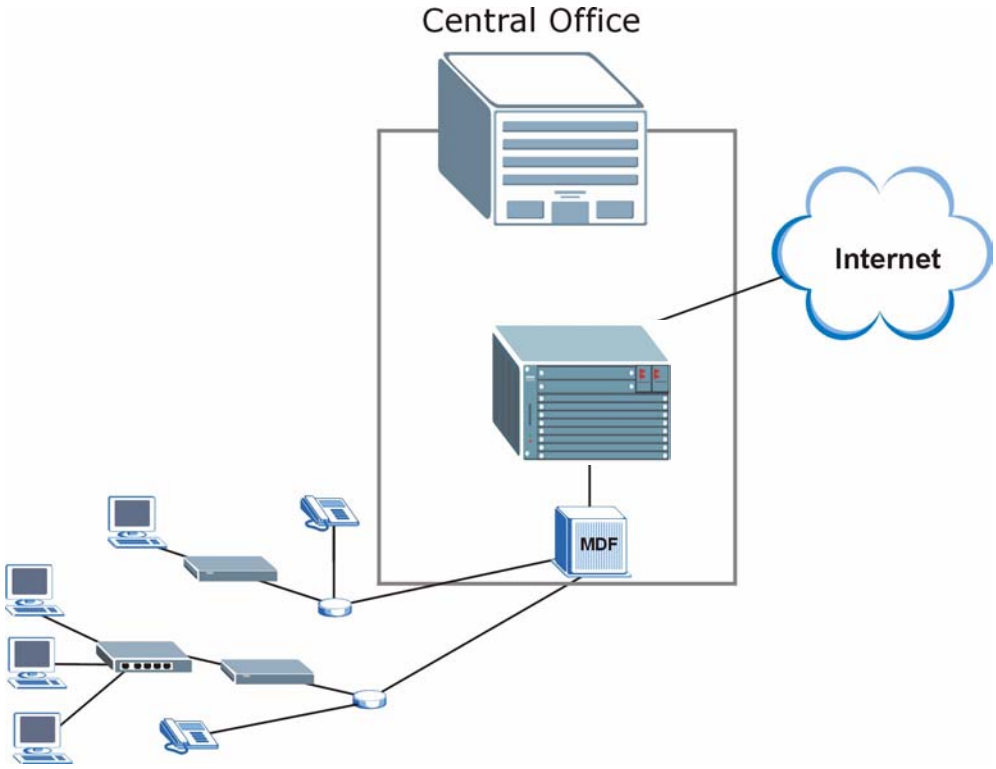
- The IES-5000 can provide Internet access and multimedia services for Multiple Tenant Units (MTU).The following diagram depicts a typical application of the IES-5000 with DSL modems, in a large residential building, that leverages existing phone line wiring to provide Internet access to all tenants. ADSL service can coexist with voice service on the same line.

**Figure 1** MTU Application




- The IES-5000 provides DSL service over telephone wires to subscribers in a Central Office (CO) application. The following figure shows the IES-5000 set up in a telephone company's central office.

**Figure 2** Central Office Application




- Other applications include telemedicine, surveillance systems, remote servers systems, cellular base stations and high-quality videoconferencing.

## 1.2 Ways to Manage the MSC1000G

Use any of the following methods to manage the MSC1000G.

- Web Configurator. This is GUI-based management using a (supported) web browser. See Chapter 3 on page 73.
- Command Line Interface. Use line commands through Telnet or the console port to manage the MSC1000G. See Chapter 19 on page 439.
- Editable plain text based configuration file
- FTP for firmware upgrades and configuration backup/restore (Chapter 36 on page 759).
- SNMP. The device can be monitored by an SNMP manager. See Chapter 15 on page 379 and Section 33.4 on page 726.

## 1.3 Features

This section introduces key IES-5000 series features.

### Management Switch Card Redundancy

You can install two management switch cards in the IES-5000 to increase system reliability. The two management switch cards must have the same types of uplink and subtending connections. One management switch card is active and the other acts as a standby.

The first management switch card installed is active. If both management switch cards are installed at the same time, the management switch card in the lower numbered slot is active. Whenever the active management switch card cannot operate (whether it is removed, restarts or crashes), the standby management switch card becomes active.

### Gigabit Ethernet Ports

The Gigabit Ethernet ports allow the switch to connect to another WAN switch or daisy-chain to other switches.

### SFP Slots

Install SFP (Small Form-factor Pluggable) transceivers in these slots to connect to other Ethernet switches at longer distances than the Ethernet port.

### Console Port

Use the console port for local management.

### DHCP Relay

DHCP (Dynamic Host Configuration Protocol RFC 2131 and RFC 2132) allows individual computers to obtain TCP/IP configuration at start-up from a server. You can configure the system as a DHCP relay agent to have another DHCP server provide TCP/IP configuration for the clients. In addition, you can set the system to forward client DHCP requests to specific DHCP servers based on the VLAN ID. You can also specify up to two DHCP servers for each VLAN to provide fail-over protection.

### DHCP Relay Option82

The system supports DHCP relay agent82 (RFC 3046) that adds additional information to client DHCP requests that the MSC1000G relays to a DHCP server. It also supports adding the sub-option 2 (Remote ID) with additional information.

### DHCP Snooping

DHCP snooping allows the system to identify packets with DHCP server assigned IP address(es) and block access of devices using unknown IP addresses on a subscriber port. You can also manually add static IP addresses to the DHCP snooping table.

### Anti-IP Address Spoofing

With DHCP snooping, a line card records which IP address is assigned to each DHCP client MAC address and the VLAN to which each IP and MAC address pair belongs. The line card drops packets from a device using an IP address that is assigned to a different MAC address.

### Downstream Broadcast Blocking

The system can block downstream broadcast packets from being sent to specified VLANs on specified ports.

### Cluster Management

Cluster management allows you to access the web configurators and CLIs of multiple DSLAMs through one DSLAM, called the cluster manager. The IESs must be directly connected and be in the same VLAN group so as to be able to communicate with one another.

### Queuing

Queuing is used to help solve performance degradation when there is network congestion. Two scheduling services are supported: Strict Priority Queuing (SPQ) and Weighted Round Robin (WRR) Queuing. This allows the MSC1000G to maintain separate queues for packets from each individual source or flow and prevent a source from monopolizing the bandwidth.

### Trunking

The management switch card can trunk (aggregate port links into one logical link) Gigabit Ethernet interfaces.

### Isolation (per-VLAN)

Use isolation to block the DSL subscribers in a specific VLAN from sending traffic directly to each other. The DSL subscribers can only send and receive traffic to and from the ports that are set to uplink mode. The Integrated Ethernet Switch blocks access between the DSL ports.

### Link Aggregation Control Protocol (LACP)

The MSC1000G supports the link aggregation IEEE 802.3ad protocol. Link aggregation (trunking) is the grouping of physical ports into one logical higher-capacity link. You may want to trunk ports if for example, it is cheaper to use multiple lower-speed links than to under-utilize a high-speed, but more costly, single-port link.

### IEEE 802.1Q Tagged VLAN

Your management switch card uses the IEEE 802.1Q Tagged VLAN (Virtual Local Area Network), which allows your device to deliver tagged/untagged frames to and from its ports.

### Multicast VLAN

Multicast VLAN is designed for applications (such as Media-on-Demand (MoD)) using multicast traffic across an Ethernet ring-based service provider network. Multicast VLAN allows one single multicast VLAN to be shared among different subscriber VLANs on the network. This improves bandwidth utilization by reducing multicast traffic in the subscriber VLANs and simplifies multicast group management.

### Transparent LAN Service (TLS)

Use TLS (also known as VLAN stacking) to add an outer VLAN tag to the inner IEEE 802.1Q tagged frames that enter the network. By tagging the tagged frames (“double-tagged” frames), the service provider can manage up to 4,094 VLAN groups with each group containing up to 4,094 customer VLANs. This allows a service provider to provide different services based on specific VLANs, for many different customers.

### PPPoA-to-PPPoE (PAE) PVC

This feature allows the system to translate PPPoA packets to PPPoE packets (and vice versa) to allow communication between CPE clients and an access concentrator (such as a BRAS) through the switch.

### PPPoE Intermediate Agent Information

Similar to DHCP relay option82, you can set the system to insert line information into client PPPoE Active Discovery Initialization (PADI) packets. This allows a PPPoE termination server to identify and authenticate a PPPoE client.

### IEEE 802.1p Priority

The system uses IEEE 802.1p priority to assign priority levels to individual PVCs. The system can also handle multiple IEEE 802.1p priority queues on a single PVC.

### Classifier and Policy

You can create a policy to define actions to be performed on a traffic flow grouped by a classifier according to specific criteria such as the IP address, port number or protocol type, and so on.

### IEEE 802.1x Port-based Authentication

Your MSC1000G supports the IEEE 802.1x standard for centralized user authentication through an optional network authentication (RADIUS) server.

### Spanning Tree Protocol (STP)/ Rapid STP (RSTP)/ Multiple STP (MSTP)

(R)STP detects and breaks network loops and provides backup links between switches, bridges or routers. It allows a switch to interact with other (R)STP -compliant switches in your network to ensure that only one path exists between any two stations on the network.

MSTP is backward compatible with (R)STP and allows you to configure multiple spanning trees for one or more VLANs and still have a loop-free network topology.

### MAC (Media Access Control) Filters

Use the MAC filter to filter incoming frames based on MAC (Media Access Control) address(es) or the OUI (Organizational Unit Identifier) that you specify. You may enable/ disable the MAC filter on specific ports. You may specify up to ten MAC addresses per port.

### MAC (Media Access Control) Count Limit

You can limit the number of MAC addresses that may be dynamically learned on a port. You may enable/disable the MAC count limit on individual ports.

### IGMP Count Limit

You can limit the number of IGMP groups a subscriber on a port can join. You may enable/ disable the IGMP count limit on individual ports.

### Static Multicast

Use static multicast to allow incoming frames based on multicast MAC address(es) that you specify. This feature can be used in conjunction with IGMP snooping to allow multicast MAC address(es) that are not learned by IGMP snooping. You can use static multicast to pass routing protocols, such as RIP and OSPF.

### IGMP Snooping

With IGMP snooping, group multicast traffic is only forwarded to ports that are members of that group. IGMP snooping generates no additional network traffic, allowing you to significantly reduce multicast traffic passing through your IES-5000.

### IGMP Proxy

The IES-5000 can act as an IGMP proxy device to reduce multicast traffic. It issues IGMP host messages to a multicast router or server on behalf of the connected multicast hosts.

### Broadcast Storm Control

Broadcast storm control limits the number of broadcast packets the management switch card receives per second on its ports.

### Secured Client

Configure up to four rules to allow up to four ranges of remote host IP addresses to access your management switch card.

### Profile Server

The profile server feature allows you to manage profiles on multiple IES-5000s.

### System Error Logging

The system error log will record error logs locally to the management switch card memory.

### Configurable Alarms

The system allows you to customize the priority levels of individual alarms and the alarm severity threshold for recording alarms on an individual port(s).

### Multiple Management Logins

The management switch card can support multiple concurrent management sessions.

### Remote Firmware Upgrade

You can use FTP or SFTP to perform configuration backup/restore and firmware upgrade from a remote location.

### Security

- Password protection for system management
- VLAN
- RADIUS client
- TACACS+ client

### Alarm LED

An **ALM** (alarm) LED lights when the second power source is not connected, the IES-5000 is overheated, the voltage readings are outside the tolerance levels a fan fails or another alarm with a severity level of MAJOR or CRITICAL occurs.

### Flow Control

The management switch card uses IEEE 802.3 flow control to manage the sending of traffic so the sending device does not transmit more than the receiving device can process. This helps prevent traffic from being dropped and having to be resent.

### Quality of Service

The MSC1000G has eight priority queues so you can ensure mission-critical data gets delivered on time.

### Multiple PVC and ATM QoS

The IES-5000 allows you to use different channels (also called Permanent Virtual Circuits or PVCs) for different services or subscribers. Define channels on each DSL port for different services or levels of service and assign each channel a priority. ATM Quality of Service (QoS) allows you to regulate the average rate and fluctuations of data transmission. This helps eliminate congestion to allow the transmission of real time data (such as audio and video).

### Priority-based PVCs

The system provides Priority-based PVCs (PPVCs) to give different priorities to PVCs that are members of the same VLAN. Use up to eight priority queues for the member PVCs. The system maps frames with certain IEEE 802.1p priorities to a PVC with a particular priority queue.

### DSCP-to-IEEE 802.1p Priority Mapping

DiffServ is a class of service (CoS) model that marks packets with DiffServ Code Points (DSCP) so that they receive specific per-hop treatment at DiffServ-compliant network devices along the route. You can configure DSCP-to-IEEE 802.1p mappings to allow the MSC1000G to prioritize all incoming traffic based on the DSCP value according to the mapping table.

### System Monitoring

- System status (link status, rates, statistics counters)
- Temperatures, voltage reports and alarms.

### Bandwidth Control

The MSC1000G supports rate limiting in 1 Mbps increments on the individual Gigabit Ethernet interfaces allowing you to limit backbone bandwidth usage. You can also apply bandwidth control on multicast traffic.

### IP-aware Bridging

The line cards can forward frames based on the destination IP address, instead of the destination MAC address, and replace the source MAC address with its own MAC address. This provides better scalability and security for large-scale access networks, especially with Ethernet.

### Single End Loop Test (SELT)

This feature checks the distance to an ADSL subscriber's location.

### Dual End Loop Test (DELT)

This feature (also called a Loop Diagnostic Mode test or LDM test) provides details about the condition of an ADSL subscriber's line.

# 2

# Hardware Connections

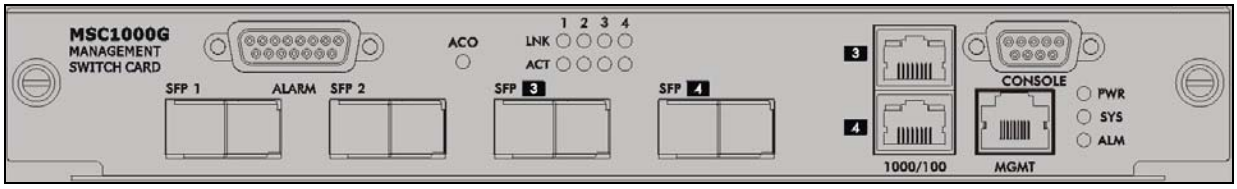
This chapter introduces the MSC1000G's hardware and how to connect it.

Refer to the Integrated Ethernet Switch's User's Guide for directions and safety warnings on installing the management switch card.

Use this chapter's port and slot descriptions to connect the management switch card.

## 2.1 Front Panel

**Figure 3** MSC1000G Front Panel




## 2.2 LEDs

**Table 1** Management Switch Card LED Descriptions

| LED | COLOR | STATUS | DESCRIPTION |
|---|---|---|---|
| PWR | Green | On | The management switch card is installed and receiving power from the main chassis. |
| | | Off | The management switch card is not receiving power from the main chassis. |
| ALM | Red | On | An alarm has been detected on the MSC1000G, the Integrated Ethernet Switch fan or the **INPUT ALARM** terminals. Examples of an alarm on the MSC1000G are when the MSC1000G's voltage or temperature is outside of the normal range. |
| | | Off | The MSC1000G has not detected an alarm on itself, the Integrated Ethernet Switch fan or the **INPUT ALARM** terminals. |

**Table 1** Management Switch Card LED Descriptions

| LED | COLOR | STATUS | DESCRIPTION |
|---|---|---|---|
| SYS | Green | Blinking | The system is initializing. |
| | | On | The management switch card is on and functioning properly. |
| | | Off | The management switch card is not receiving power, is not ready or has malfunctioned. |
| 1000/ 100 | Yellow | Blinking | The port is transmitting/receiving to/from a 100 Mbps Ethernet network. |
| | | On | A 100 Mbps Ethernet link is up. |
| | | Off | The Ethernet link is down. |
| | Green | Blinking | The port is transmitting/receiving to/from a 1000 (1 Gbps) Mbps Ethernet device. |
| | | On | A 1000 Mbps (1 Gbps) Ethernet link is up. |
| | | Off | The Ethernet link is down. |
| MGMT | Yellow | Blinking | The port is transmitting/receiving to/from a 100 Mbps Ethernet network. |
| | | On | A 100 Mbps Ethernet link is up. |
| | | Off | The Ethernet link is down. |
| | Green | Blinking | The port is transmitting/receiving to/from a 10 Mbps Ethernet device. |
| | | On | A 10 Mbps Ethernet link is up. |
| | | Off | The Ethernet link is down. |
| The following LEDs apply to the SFP slots. | | | |
| LNK 1~4 | Green | On | A 1000 Mbps (1 Gbps) Ethernet link is up. |
| | | Off | The Ethernet link is down. |
| ACT 1~4 | Green | Blinking | The system is transmitting/receiving Ethernet traffic. |
| | | Off | The system is not transmitting/receiving Ethernet traffic. |

## 2.3 Ports and Connections

Install the MSC1000G before you make the hardware connections. Refer to the IES-5000 User's Guide for installation instructions.

**Table 2** Front Panel Descriptions

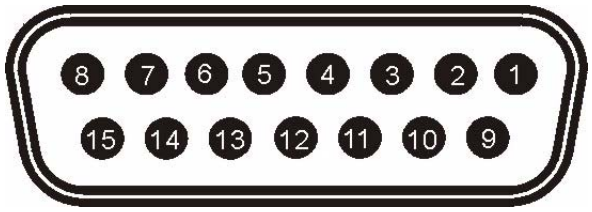
| LABEL | DESCRIPTION |
|---|---|
| ALARM | This DB15F connector is for connecting to alarm input and alarm output terminals on other pieces of equipment. |
| ACO | Press this Alarm Cut Off Button to cancel an alarm. This stops the sending of the alarm signal current. This is useful in stopping an alarm if you have the alarm output connector pins connected to a visible or audible alarm. The alarm entry remains in the system. |

**Table 2** Front Panel Descriptions (continued)

| LABEL | DESCRIPTION |
|---|---|
| 1000/100 | The management switch card uses one or two uplink ports for connecting to an Ethernet switch(es) that is part of a high-bandwidth backbone network.<br>This is an electrical Ethernet interface for use with the following copper Ethernet cables:<br>a). 100Base-Tx 2 pair UTP Cat. 5, up to 100m<br>b). 1000Base-T 4-pair UTP Cat. 5, up to 100m<br>Connector: RJ-45<br>For better performance and lower radiation noise, use shielded Ethernet cables. |
| SFP | These are slots for SFP transceivers. |
| MGMT | This is an RJ-45 Ethernet port for connecting to an Ethernet network for out-of-band management (a separate channel for management that is not part of the channels that are usually used for data transfer). |
| CONSOLE | This DB-9 RS-232 port is for connecting to a computer for local management. |

## 2.3.1 Alarm Connections

**Figure 4** ALARM Connector Pin Layout




A closed circuit on the **ALARM** input pins indicates an alarm.

- Pins 1 and 9 are alarm input one.
- Pins 2 and 10 are alarm input two.
- Pins 3 and 11 are alarm input three.

The MSC1000G signals an alarm when it detects an alarm on the **ALARM** input pins, the IES-5000 is overheated, the voltage readings are outside the tolerance levels a fan fails or another alarm occurs.

To signal a minor alarm, the MSC1000G opens the circuit for pins 4 and 12 and closes the circuit for pins 5 and 12.

To signal a major alarm, the MSC1000G opens the circuit for pins 13 and 6 and closes the circuit for pins 14 and 6.

To signal a critical alarm, the MSC1000G opens the circuit for pins 7 and 15 and closes the circuit for pins 8 and 15.

Examples of an alarm on the MSC1000G are when the MSC1000G's voltage or temperature is outside of the normal range.

## 2.3.2 Gigabit Ethernet Interfaces

There are two Gigabit Ethernet SFP slots and two Gigabit Ethernet port/SFP slot pairs. The SFP slots have priority over the Gigabit ports. This means that if a SFP transceiver and the corresponding Gigabit port are connected at the same time, the Gigabit port will be disabled.

The Ethernet ports are auto-negotiating and can detect and adjust to the optimum Ethernet speed (100/1000 Mpbs) and duplex mode (full duplex or half duplex) of the connected device.

The Ethernet ports are also auto-crossover (auto-MDI/MDI-X), they automatically work with a straight-through or crossover Ethernet cable.

### 2.3.2.1 Uplink and Subtending

SFP slots 1 and 2 are subtending ports. The Gigabit Ethernet port/SFP slot pairs labeled 3 and 4 are uplink ports.

The Gigabit Ethernet SFP slots and ports can function in either subtending or uplink mode. Connect a port in uplink mode to an backbone Ethernet switch or router. The management switch card allows traffic between the ports in uplink mode and the DSL ports on the line cards.

Use the subtending mode to daisy-chain other Ethernet switches. With subtending mode, the management switch card allows traffic between the ports in subtending mode and the ports in uplink mode. The management switch card does not allow traffic between the ports in subtending mode and the DSL ports on the line cards.

See Section 32.11.9 on page 703 to change the mode of a Gigabit Ethernet port.

## 2.3.3 SFP Slots

These are slots for SFP transceivers. A transceiver is a single unit that houses a transmitter and a receiver. The switch does not come with transceivers. You must use transceivers that comply with the SFP Transceiver MultiSource Agreement (MSA). See the SFF committee's INF-8074i specification Rev 1.0 for details.

SFP slots 1 and 2 are separate interfaces.

SFP slots 3 and 4 are combined with Gigabit Ethernet ports 3 and 4 respectively. The SFP ports have priority over the Gigabit ports. This means that if a SFP transceiver and the corresponding Gigabit port are connected at the same time, the Gigabit port will be disabled.

You can change transceivers while the MSC1000G is operating. You can use different transceivers to connect to Ethernet switches with different types of fiber-optic connectors.

- Type: SFP connection interface
- Connection speed: 1 Gigabit per second (Gbps)

To avoid possible eye injury, do not look into an operating fiber-optic module's connectors.

#### 2.3.3.1 Transceiver Installation

Use the following steps to install a mini GBIC transceiver (SFP module) in a slot.

The slot is at an angle. Do not attempt to straighten it.

1. Remove the dust cover from the transceiver.
2. For transceivers with a flip-up or flip-down latch, close the latch.
3. Insert the fiber-optic cables into the transceiver (you may need to remove cable dust covers).
4. Insert the transceiver into the slot with the exposed section of PCB board facing down.
5. Press the transceiver firmly until it clicks into place.

**Figure 5** Transceiver Installation

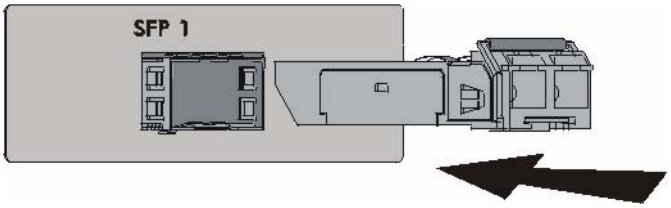
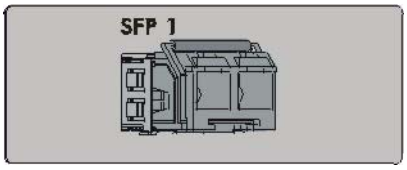



**Figure 6** Installed Transceiver




#### 2.3.3.2 Transceiver Removal

Use the following steps to remove a mini GBIC transceiver (SFP module) from the slot.

1. Remove the fiber-optic cables from the transceiver.
2. Unlock the transceiver's latch (latch styles vary).
3. Pull the transceiver out of the slot.
4. Put the transceiver's dust cover on the transceiver.

**Figure 7** Opening the Transceiver Latch

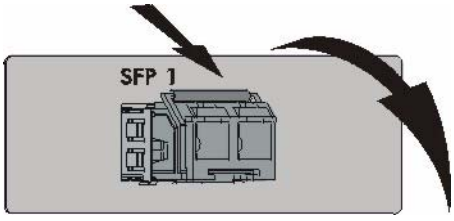
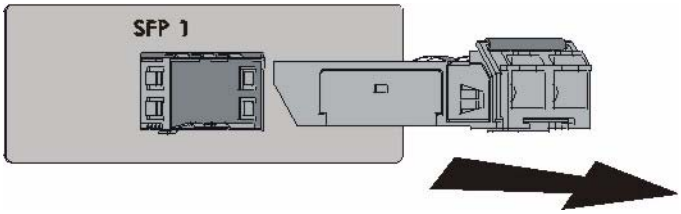


**Figure 8** Removing the Transceiver




### Console Port

Use the console port for local management of the MSC1000G.

# PART II
# Web Configurator

The Web Configurator (73)
Tutorials (85)
Access Control List Screens (91)
Alarm Screens (131)
Cluster Screens (145)
Diagnostic Screens (151)
Maintenance Screens (163)
Multicast Screens (167)
Subscriber Port Setup Screens (181)
Profile Screens (265)
Statistics Screens (301)
Switch Screens (345)
Sys Screens (379)
VLAN Screens (395)
VoIP (403)
Config Save (435)

# 3

# The Web Configurator

This section introduces the configuration and functions of the web configurator.

## 3.1 Web Configurator Introduction

The web configurator is an HTML-based management interface that allows easy switch setup and management via Internet browser. Use Internet Explorer 6.0 and later or Netscape Navigator 7.0 and later versions. The recommended screen resolution is 1024 by 768 pixels.

In order to use the web configurator you need to allow:

- Web browser pop-up windows from your device. Web pop-up blocking is enabled by default in Windows XP SP (Service Pack) 2.
- JavaScript (enabled by default).
- Java permissions (enabled by default).

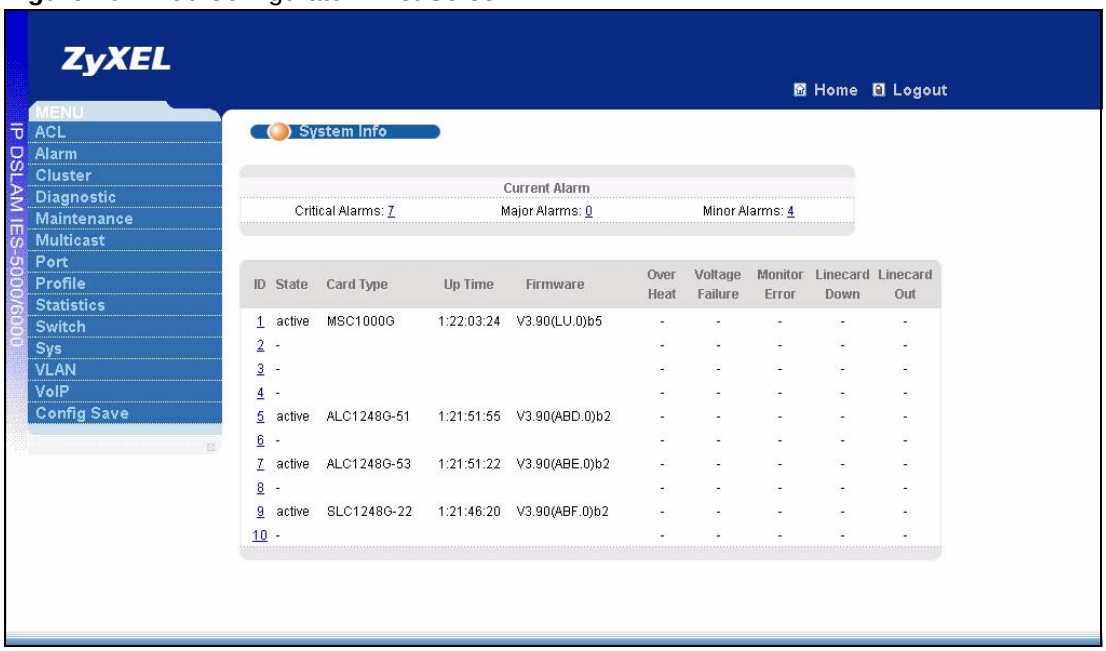
## 3.2 System Login

1. Start your web browser.
2. Type “http://” and the IP address of the switch in the **Location** or **Address** field. Press [ENTER]. 192.168.1.1 is the default in-band management IP address and 192.168.0.1 is the default out-of-band (management port) IP address.
3. The login screen appears. The default username is **admin** and associated default password is **1234**. The date and time display as shown if you have not configured a time server nor manually entered a time and date in the **General Setup** screen.

**Figure 9** Web Configurator: Login

4 Click **OK** to view the first web configurator screen.

**Figure 10** Web Configurator: First Screen




## 3.3 Navigation Panel

In the navigation panel (the column on the left), click a main link to reveal a list of submenu links. The following table describes the links in the navigation panel.

**Table 3** Navigation Panel Links

| LINK | DESCRIPTION |
|---|---|
| ACL | |
| DHCP Relay | This link takes you to a screen where you can configure DHCP relay information and specify the DHCP server(s). |
| DHCP Snoop | This link takes you to screens where you can activate DHCP snooping and configure static client IP addresses on a port. |
| Downstream Broadcast | This link takes you to a screen where you can block downstream broadcast packets from being sent to specified VLANs on specified ports. |
| MAC Count | This link takes you to a screen where you can limit the number of MAC addresses that can connect to a subscriber port. |
| MAC Filter | This link takes you to a screen where you can allow only traffic from specified source MAC addresses on the specified subscriber ports. |
| OUI Filter | This link takes you to a screen where you can allow only traffic from MAC addresses with the specified OUI on the specified subscriber ports. |
| Packet Filter | This link takes you to a screen where you can allow or drop specified packet types on the specified subscriber ports. |
| 802.1X PNAC | This link takes you to a screen where you can configure RADIUS (Remote Authentication Dial-In User Service) and IEEE 802.1x authentication settings. |
| Upstream Broadcast | This link takes you to a screen where you can configure the bandwidth for upstream broadcast packets for the line card. |

**Table 3** Navigation Panel Links (continued)

| LINK | DESCRIPTION |
|---|---|
| Rule | This link takes you to a screen where you can apply ACL profiles on the PVCs. |
| AntiMacspoof | This link takes you to a screen where you can enable or disable protection against MAC address spoofing. |
| DSCP | This link takes you to a screen where you can configure DSCP mapping (priorities) for individual subscriber ports. |
| PPPoE | This link takes you to a screen where you can configure PPPoE line information for individual VLANs. |
| Alarm | |
| Current Alarm | This link takes you to a screen where you can display current detailed alarms by severity or time period. |
| History Alarm | This link takes you to a screen where you can display historical alarms by severity or time period. |
| Alarm Port Setup | This link takes you to a screen where you can set the severity level of alarms to record on specified ports. |
| Alarm Severity Assignment | This link takes you to a screen where you where you can configure the log facility, message type and severity of the alarm categories. |
| Alarm Clear | This link takes you to a screen where you can erase alarm entries. |
| Alarm Input | This link takes you to a screen where you can configure the names for external alarms. |
| Cluster | |
| Cluster Status | This link takes you to a screen where you can view clustering status |
| Cluster Configuration | This link takes you to a screen where you can configure clustering management. |
| Diagnostic | |
| LDM | This link takes you to a screen where you can perform LDM (Loop Diagnostic Mode) tests on a subscriber port. |
| Loopback | This link takes you to a screen where you can perform an OAMF5 loopback test on a subscriber port or PVC. |
| IP Ping | This link takes you to a screen where you can ping a host. |
| IP Trace Route | This link takes you to a screen where you can send a traceroute packet to an IP address and use the response to determine the path a packet takes to that IP address. |
| MLT | This link takes you to a screen where you can test the lines connected to VOP ports. |
| CFM Loopback | This link takes you to a screen where you can perform the connectivity fault management loop back test. |
| CFM Linktrace | This link takes you to a screen where you can perform the connectivity fault management link trace test. |
| SELT | This link takes you to a screen where you can perform a SELT (Single End Loop Test) on a port to check the distance to the subscriber's location. |
| Maintenance | |
| Config Backup | This link takes you to a screen where you can back up your current system configuration. |
| Config Restore | This link takes you to a screen where you can restore a previously saved configuration. |

**Table 3** Navigation Panel Links (continued)

| LINK | DESCRIPTION |
|---|---|
| Config Reset | This link takes you to a screen where you can reset the system back to the factory defaults. |
| Firmware Upgrade | This link takes you to a screen where you can upload a new firmware. |
| Reboot | This link takes you to a screen where you can restart the system. |
| Multicast | |
| IGMP Setup | This link takes you to screens where you can enable or disable IGMP proxy or IGMP snooping and assign IGMP filter profiles to subscriber ports. |
| Static Multicast | This link takes you to a screen where you can configure static multicast group entries. |
| Mvlan | This link takes you to a screen where you can configure multicast VLAN. |
| Port | |
| ADSL | This link takes you to screens where you can configure the ADSL ports. |
| VDSL | This link takes you to screens where you can configure the VDSL ports. |
| SHDSL | This link takes you to screens where you can configure the SHDSL ports. |
| PVC | This link takes you to screens where you can configure PVCs (Permanent Virtual Circuits) on subscriber ports. |
| Copy | This link takes you to a screen where you can copy port settings from a source port to destination ports on the same type of line card. |
| IP Bridge | This link takes you to a screen where you can configure IP-aware bridging, where the system forwards packets based on destination IP address instead of destination MAC address. |
| G.bond | This link takes you to screens where you can configure G.bond, letting subscribers connect to an ISP using data streams spread over multiple DSL lines. |
| VoIP SIP | This link takes you to a screen where you can configure VoIP SIP settings. |
| VoIP H248 | This link takes you to a screen where you can configure VoIP H248 settings. |
| ENET | This link takes you to a screen where you can configure the Fast Ethernet ports. |
| Profile | |
| ADSL | This link takes you to a screen where you can configure ADSL profiles. |
| VDSL | This link takes you to a screen where you can configure VDSL profiles. |
| SHDSL | This link takes you to a screen where you can configure SHDSL profiles. |
| ATM | This link takes you to a screen where you can configure ATM traffic profiles. |
| Alarm ADSL | This link takes you to a screen where you can configure ADSL alarm profiles. |
| Alarm VDSL | This link takes you to a screen where you can configure VDSL alarm profiles. |
| Alarm SHDSL | This link takes you to a screen where you can configure SHDSL alarm profiles. |
| IGMP Filter | This link takes you to a screen where you can configure IGMP filter profiles. |
| VoIP SIP | This link takes you to a screen where you can configure VoIP SIP filter profiles. |
| VoIP SIP CALLSVC | This link takes you to a screen where you can configure VoIP SIP CALLSVC filter profiles. |
| VoIP DSP | This link takes you to a screen where you can configure VoIP DSP filter profiles. |

**Table 3** Navigation Panel Links (continued)

| LINK | DESCRIPTION |
|---|---|
| VoIP H248 | This link takes you to a screen where you can configure VoIP H248 filter profiles. |
| IPQoS | This link takes you to a screen where you can configure IPQoS (Quality-of-Service) profiles. |
| ACL | This link takes you to a screen where you can configure ACL (Access Control Logic) profiles to have the system classify and perform actions on the upstream traffic. |
| Dialplan | This link takes you to a screen where you can set up and manage the VoIP dial plan profiles. |
| Statistics | |
| ARP Table | This link takes you to a screen where you can view the MAC address to IP address resolution table. |
| DHCP | This link takes you to a screen where you can view DHCP counters and DHCP snooping information. |
| MAC Table | This link takes you to a screen where you can see the MAC addresses that the system has dynamically learned. |
| IGMP Status | This link takes you to a screen where you can view information collected by IGMP snooping and/or IGMP proxy. |
| IP Bridge | This link takes you to a screen where you can view IP bridge information. |
| Online Users | This link takes you to a screen where you can view information about administrators that are logged into the system. |
| Port Statistics | This link takes you to screens where you can view port statistics and status. You can also view RMON history information on the switch ports. |
| Dot3ad | This link takes you to a screen where you can view the link aggregation status. |
| VLAN | This link takes you to screens where you can view the VLAN settings and status. |
| MSTP | This link takes you to screens where you can view the MSTP status and statistics. |
| IP | This link takes you to a screen where you can view the port IP statistics. |
| G.bond | This link takes you to a screen where you can view G.bond statistics. |
| CFM | This link takes you to a screen where you can view the connectivity fault management statistics. |
| H248 | This link takes you to a screen where you can view a list of media gateways and their states. |
| Proxy Server | This link takes you to a screen where you can view a list of SIP proxy servers assigned to a line card and their states. |
| Switch | |
| Switch Setup | This link takes you to a screen where you can set up global switch parameters such as GARP, link aggregation, priority queues and a port's queuing method. |
| MSTP | This link takes you to a screen where you can configure spanning tree settings to prevent network loops. |
| Switch Port Setup | This link takes you to a screen where you can configure settings for individual Gigabit Ethernet interfaces. |
| CFM | This link takes you to screens where you can configure settings for connectivity fault management. |
| Sys | |

**Table 3** Navigation Panel Links (continued)

| LINK | DESCRIPTION |
|---|---|
| Access Control | This link takes you to screens where you can configure SNMP and remote management. |
| General Setup | This link takes you to a screen where you can configure general identification information about the switch and the time and date settings. |
| IP Setup | This link takes you to a screen where you can configure the in-band and out-of-band management IP addresses and subnet masks. |
| Unix SysLog | This link takes you to a screen where you can configure the syslog settings. |
| User Account | This link takes you to screens where you can configure a user account and its level of access privileges and authentication settings. |
| Monitor | This link takes you to screens where you can configure the hardware monitor alarm thresholds. |
| VLAN | |
| VLAN | This link takes you to screens where you can configure static VLANs. |
| Port Setting | This link takes you to screens where you can configure port VLAN settings. |
| VoIP | |
| ARP | This link takes you to a screen where you can configure ARP (Address Resolution Protocol) settings for VoIP cards. |
| Countrycode | This link takes you to a screen where you can configure regional VoIP settings. |
| IP | This link takes you to a screen where you can configure TCP/IP settings on the VoIP line cards. |
| Route | This link takes you to a screen where you can configure routing settings for the VoIP line cards. |
| Number Plan | This link takes you to a screen where you can configure number plans which control how dialed numbers of certain types can be automatically modified before onward transmission. |
| VoIP H248 | This link takes you to a screen where you can configure media gateways on VoIP line cards. |
| Local Help | This link takes you to a screen where you can configure which local subscribers are called instead of public emergency (or other) numbers in the event that the link to the VoIP provider is not available. |
| Key Pattern | This link takes you to a screen where you can configure the numbers to press to access VoIP services such as call waiting. |
| Dialplan | This link takes you to a screen where you can configure a VoIP dial plan (or number plan). |
| Localcall | This link takes you to a screen where you can configure . |
| Config Save | |
| Config Save | This link takes you to a screen where you can save the device's configuration into the nonvolatile memory (the system's storage that remains even if the power is turned off). |

The following table lists the various web configurator screens within the sub-links.

**Table 4** Web Configurator Screen Sub-links Details

| **ACL** | **Alarm** | **Cluster** | **Diagnostic** |
|---|---|---|---|
| DHCP Relay | Current Alarm | Cluster Status | LDM |
| DHCP Snoop | Critical | Cluster Status - Member | Loopback |
| DHCP Snoop Slot | Major | Cluster Configuration | IP Ping |
| Downstream Broadcast | Minor | | IP Trace Route |
| Downstream Broadcast Slot | All | | MLT |
| MAC Count | History Alarm | | CFM Loopback |
| MAC Count Slot | Critical | | CFM Linktrace |
| MAC Filter | Major | | SELT |
| MAC Filter Slot | Minor | | |
| OUI Filter | All | | |
| OUI Filter Slot | Alarm Port Setup | | |
| Packet Filter | Alarm Port Setup Slot | | |
| Packet Filter Slot | Alarm Severity Assignment | | |
| 802.1X PNAC | DSL | | |
| Port Setup | Equipment | | |
| RADIUS | System | | |
| 802.1X PNAC Slot | Ethernet | | |
| Upstream Broadcast | VoIP | | |
| Rule | Intf | | |
| AntiMacspoof | Alarm Clear | | |
| DSCP Setup | Alarm Input | | |
| DSCP Port | | | |
| DSCP Port Slot | | | |
| PPPoE | | | |

**Table 4** Web Configurator Screen Sub-links Details (continued)

| **Maintenance** | **Multicast** | **Port** | **Profile** |
|---|---|---|---|
| Config Backup<br>Config Restore<br>Config Reset<br>Firmware Upgrade<br>Reboot | IGMP<br>IGMP Setup<br>Port Setup<br>IGMP Port Setup Slot<br>Bandwidth<br>Static Multicast<br>MVLAN Setup<br>MVLAN Group Setup | ADSL<br>ADSL Port Setup<br>ADSL Port Setup Slot<br>ADSL Port Setup Advanced<br>VDSL<br>VDSL Port Setup<br>VDSL Port Setup Slot<br>VDSL Port Setup Advanced<br>VLAN Setup<br>PVLAN Setup<br>SHDSL<br>SHDSL Port Setup<br>SHDSL Port Setup Slot<br>SHDSL Port Setup Advanced<br>PVC<br>PVC Setup Slot<br>PVC Setup VLAN<br>PVC Setup PVLAN<br>Copy<br>IP Bridge<br>ARP Proxy<br>Domain<br>Edgerouter<br>Interface<br>IPBPVC<br>IPBPVC Slot<br>Route<br>G.bond<br>G.bond Setup Slot<br>VoIP SIP<br>VoIP SIP Setup Slot<br>VoIP SIP Port Setup<br>VoIP H248<br>VoIP H248 Setup Slot<br>VoIP H248 Port Setup<br>Enet<br>Enet Port Setup<br>Enet Port Setup Slot<br>Enet Port Setup<br>VLAN Setup | ADSL<br>VDSL<br>SHDSL<br>ATM<br>Alarm ADSL<br>Alarm VDSL<br>Alarm SHDSL<br>IGMP Filter<br>VoIP SIP<br>VoIP SIP CALLSVC<br>VoIP DSP<br>VoIP H248<br>IPQoS<br>ACL<br>VoIP Dialplan |

**Table 4** Web Configurator Screen Sub-links Details (continued)

| | | | |
|---|---|---|---|
| **Statistics**<br>ARP Table<br>DHCP<br>MAC Table<br>IGMP Status<br>Status<br>Port Status<br>IP Bridge<br>ARP Proxy<br>Interface<br>Route<br>Online Users<br>Port Statistics<br>Counter Slot<br>Packet Counter<br>Line Detail<br>Current<br>15Min<br>1day<br>Status<br>Dot3ad<br>VLAN<br>MSTP<br>CIST<br>MSTI<br>IP<br>G.bond<br>CFM Endpoint<br>H248<br>Proxy Server | **Switch**<br>Switch Setup<br>General<br>Dot3ad<br>QSchedule<br>Isolation<br>MSTP<br>Bridge<br>Port<br>Switch Port Setup<br>Port<br>802.1P/1Q<br>Bandwidth<br>Broadcast<br>DSCP<br>CFM<br>CFM Maintenance Association<br>CFM Endpoint: MEP<br>CFM Endpoint: MIP<br>CFM Endpoint: MIP Slot<br>CFM LBR<br>CFM LBR Slot | **Sys**<br>Access Control<br>SNMP<br>Access Ctrl<br>Secured Client<br>General Setup<br>IP Setup<br>Unix SysLog<br>User Account<br>User Account<br>Authentication<br>Monitor | **VLAN**<br>VLAN<br>Port Setting<br>VLAN Slot<br>VLAN Detail |
| **VoIP**<br>ARP<br>Countrycode<br>IP<br>Route<br>Number Plan<br>VoIP H248<br>Local Help<br>Key Pattern<br>Dialplan<br>Localcall | **Config Save**<br>Config Save | | |

## 3.4 Saving Your Configuration

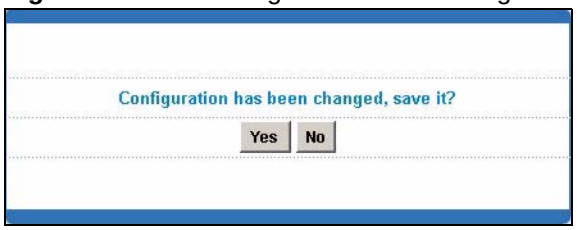
Click **Apply** in a configuration screen when you are done modifying the settings in that screen to save your changes back to the run time memory and to make your changes take effect.

Click **Config Save** in the navigation panel and then the **Save** button to save your configuration to nonvolatile memory. Nonvolatile memory refers to the switch's storage that remains even if the switch's power is turned off.

Use **Config Save** when you are done with a configuration session.

If you log out of the web configurator without saving configuration changes, a screen displays as shown. Click **Yes** to save the changes or click **No** if you do not want to save the changes. Unsaved changes are lost when the switch's power is turned off.

**Figure 11** Web Configurator: Save Configuration on Logout




## 3.5 Logging Out of the Web Configurator

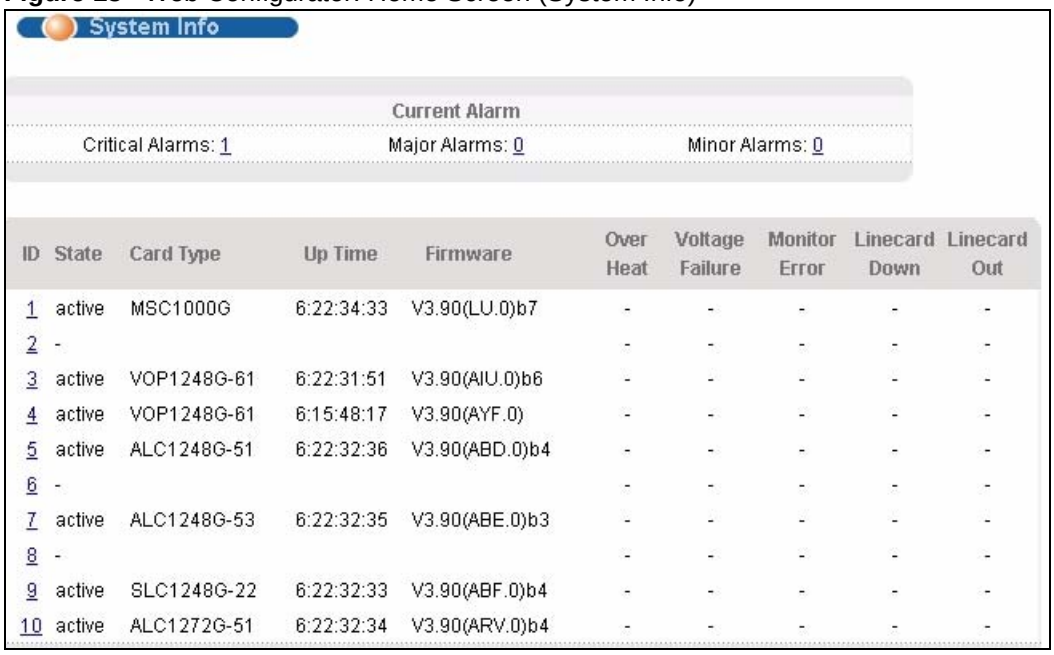
Click **Logout** in a screen to exit the web configurator. You have to log in with your password again after you log out. This is recommended after you finish a management session both for security reasons and so as you don't lock out other switch administrators.

**Figure 12** Web Configurator: Logout Screen

## 3.6 System Info

The **System Info** screen is the first screen that displays when you access the web configurator.

**Figure 13** Web Configurator: Home Screen (System Info)


System Info
Current Alarm
Critical Alarms: 1
Major Alarms: 0
Minor Alarms: 0
ID State Card Type Up Time Firmware Over Heat Voltage Failure Monitor Error Linecard Down Linecard Out
1 active MSC1000G 6:22:34:33 V3.90(LU.0)b7 - - - - -
2 - - - - - - -
3 active VOP1248G-61 6:22:31:51 V3.90(AIU.0)b6 - - - - -
4 active VOP1248G-61 6:15:48:17 V3.90(AYF.0) - - - - -
5 active ALC1248G-51 6:22:32:36 V3.90(ABD.0)b4 - - - - -
6 - - - - - - -
7 active ALC1248G-53 6:22:32:35 V3.90(ABE.0)b3 - - - - -
8 - - - - - - -
9 active SLC1248G-22 6:22:32:33 V3.90(ABF.0)b4 - - - - -
10 active ALC1272G-51 6:22:32:34 V3.90(ARV.0)b4 - - - - -

The following table describes the labels in this screen.

**Table 5** System Info (Home)

| LABEL | DESCRIPTION |
|---|---|
| Current Alarm | Click the links to view detailed alarm information (see Section 6.1 on page 131). |
| Critical Alarms | This field displays the number of critical alarms occurred. Click the link to display the **Current Alarm: Critical Alarm** screen. |
| Major Alarms | This field displays the number of major alarms occurred. Click the link to display the **Current Alarm: Major Alarm** screen. |
| Minor Alarms | This field displays the number of minor alarms occurred. Click the link to display the **Current Alarm: Minor Alarm** screen. |
| ID | This is the slot number of a line card. Click the index number of an active line card to display the **System Info - Slot screen to view detailed status.** |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |
| Over Heat | This field indicates whether the temperate of the line card is too high. |
| Voltage Failure | This field indicates whether the voltage on the line card is out of the tolerance range. |
| Monitor Error | This field indicates if no line card status information can be obtained. |

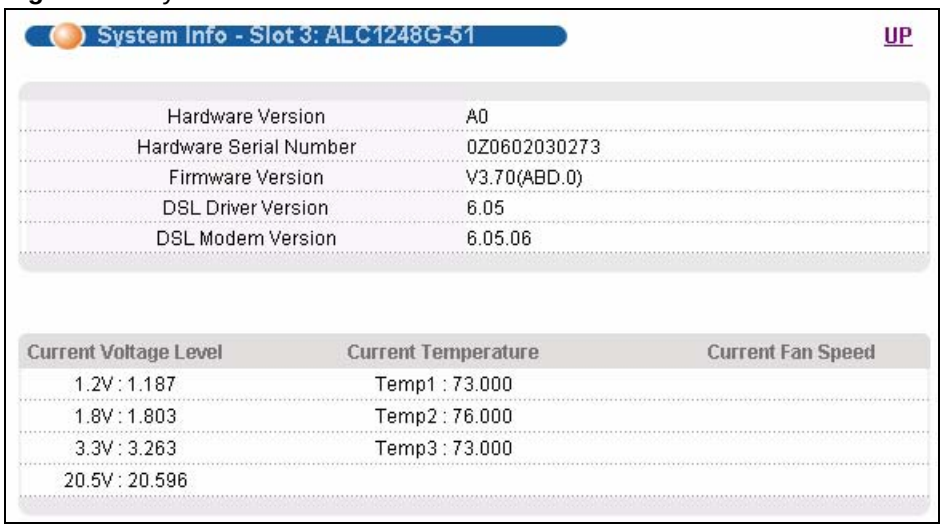
**Table 5** System Info (Home) (continued)

| LABEL | DESCRIPTION |
|---|---|
| Linecard Down | This field indicates whether the line card has failed. |
| Linecard Out | This field indicates whether the line card is removed from its slot. |

## 3.6.1 Card Status Details

To view detailed card status information, click an index number of an active card in the **System Info** screen.

**Figure 14** System Info: Slot




The following table describes the labels in this screen.

**Table 6** System Info: Slot

| LABEL | DESCRIPTION |
|---|---|
| Hardware Version | This is the version of the physical device hardware. |
| Hardware Serial Number | This is the individual identification number assigned to the device at the factory. |
| Firmware Version | This field displays the version number of the device's current firmware including the date created. |
| DSL Driver Version | This field displays the version number of the line card's driver. |
| DSL Modem Version | This field displays the version number of the line card's modem code. |
| Current Voltage Level | This field displays the current voltage readings. |
| Current Temperature | This field displays the current temperature at the sensors |
| Current Fan Speed | This field is not applicable for line cards.<br>This field displays the current fan speeds. |

# 4

# Tutorials

This chapter contains instructions to quickly set up features on the system.

- Initial Configuration (Section 4.1 on page 85)
- H.248 Configuration Example (Section 4.2 on page 87)

## 4.1 Initial Configuration

This section shows what you first need to do to provide service to subscribers connected to a line card.

1 Click **Sys** > **IP Setup**.

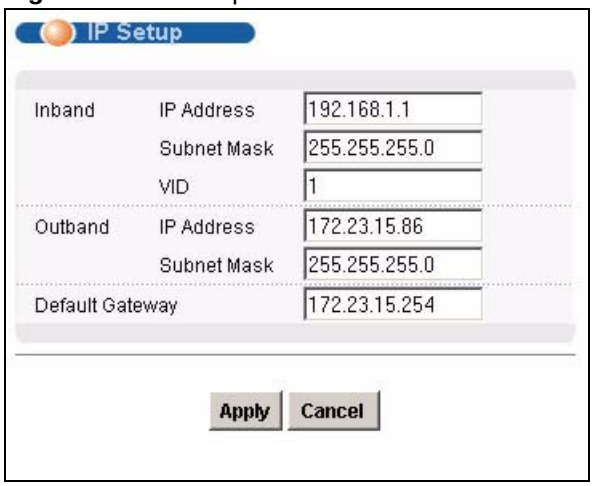
**Figure 15** Sys: IP Setup Menu

2 Use this screen to change the in-band and out-of-band management IP address and subnet mask settings. You also need to configure a default gateway IP address for the system. Apply the settings. If you change the IP address, you must use the new IP address if you want to access the web configurator again.

3 You can also change the in-band management VLAN (CPU). You can only manage the MSC1000G through ports that are members of the management VLAN.

By default, you can access the management VLAN from all of the IES-5000's in-band ports since they are all in the management VLAN. If you need more security, please see Section 26.2.9.1 on page 503 for an example of changing the management VLAN.

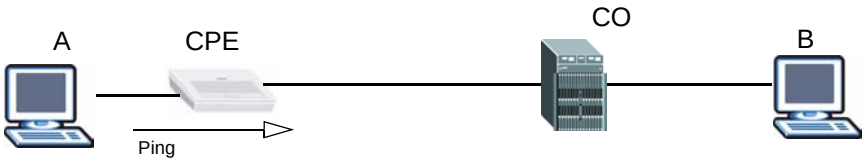
**Figure 16** IP Setup




**4** Use the following steps to quickly test the connection between the Device and VDSL subscribers.

First make sure you correctly install a VLC line card. See the Quick Start Guide for installing a line card. Connect one VDSL CPE device's (for example, P870H-51) DSL port to one VLC card's port (in this example, slot 7 and port 1). Connect a computer (**A**) to the CPE's LAN port and connect another computer (**B**) to an MSC1000G's Ethernet port (for example, port 2).

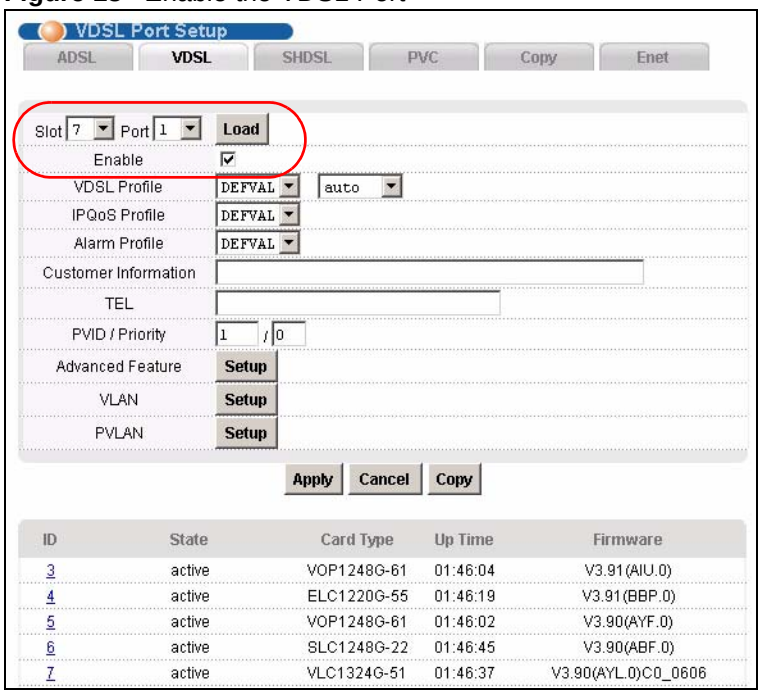
**Figure 17** Subscriber Connection Test




**5** Enable the VDSL port in the **Port** > **VDSL** screen on the Device.

Select slot **7** and port **1**, and click **Load** to display the settings as shown in this screen. Select **Enable** and click **Apply**.

**Figure 18** Enable the VDSL Port




6 Configure the IP address for **A** (for example, 192.168.1.33) and **B** (for example, 192.168.1.254).

7 Use the command “ping 192.168.1.254” in **A**’s DOS mode to check the connection with **B**.

If the ping response is successful, you can now (with the other settings set to the defaults) provide service to DSL subscribers connected to the line card. See the appendices for information on other default settings.

## 4.2 H.248 Configuration Example

This section provides an example of using configuring a VoIP line card to communicate with an H.248 MGC (Media Gateway Controller). The VoIP line card must be running the H.248 firmware (identified by the code “AYF” in the firmware name) not the SIP firmware (identified by the code “AIU” in the firmware name). You should already have information about the MGC’s configuration.

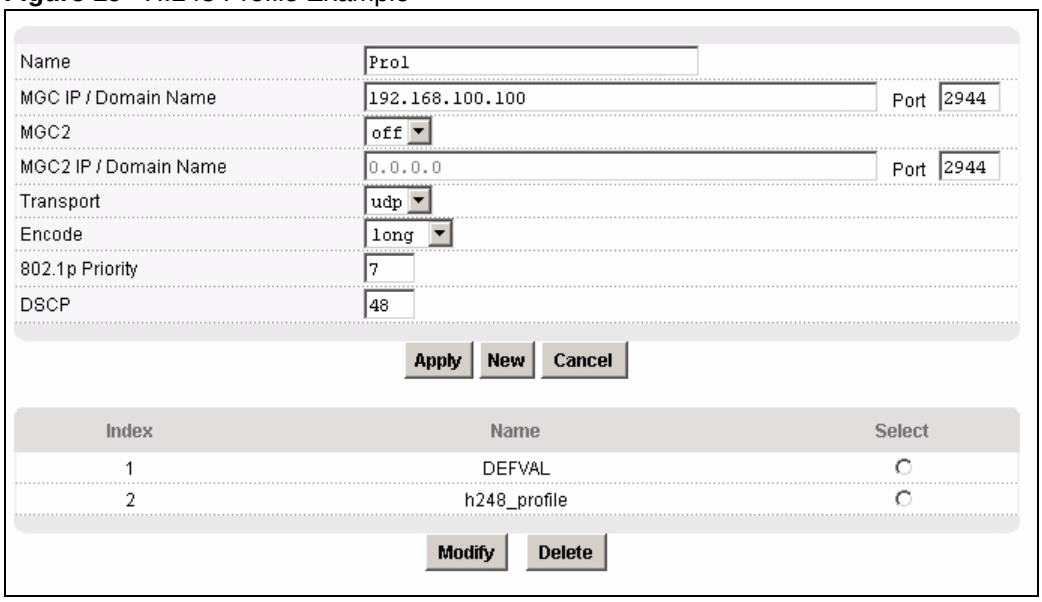
Take the following steps to configure the line card.

1 **Create an H.248 profile.**

Use the **Profile** > **VoIP H248** screen (see Section 12.19 on page 292).

- Enter the configuration information about the MGC, and give the profile a name. This example creates a profile named **Pro1** for an MGC with an IP address **192.168.100.100** using the **UDP** transport method and the **long** encoding format. If you were not provided with information for any of the fields in this screen, leave them at their defaults.
- Click **Apply**. The new profile displays at the bottom of the screen with the other H.248 profiles.

**Figure 19** H.248 Profile Example

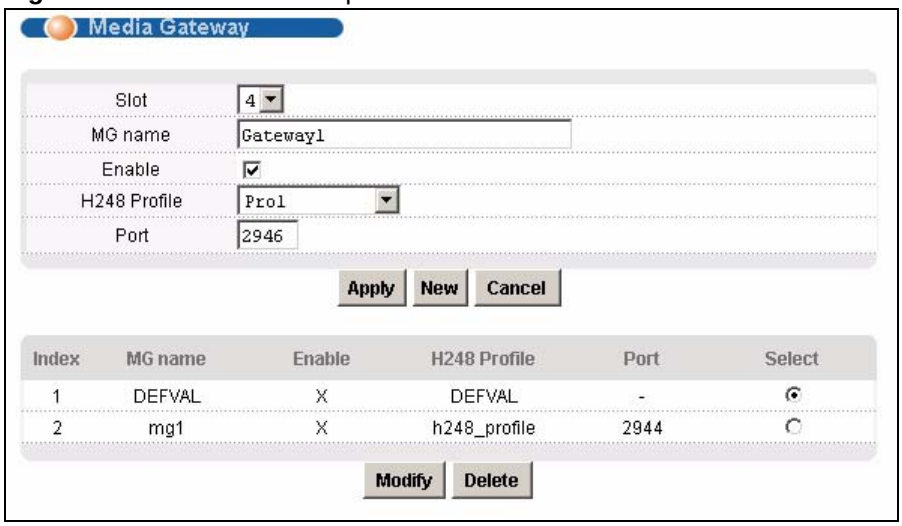



**2 Create a virtual MG.**

Use the **VoIP** > **VoIP H248** screen (see Section 17.9 on page 426).

- Select the **Slot** in which you installed the H.248-enabled VoIP line card.
- Enter an **MG Name** (**Gateway1** in this example).
- Select **Enable**.
- Select the **Profile** you set up in step 1 (**Pro1** in this case).
- Select a **Port** that does not belong to another MG (or other service).
- Click **Apply**. The new virtual MG displays at the bottom of the screen with the other virtual MGs.

**Figure 20** Virtual MG Example



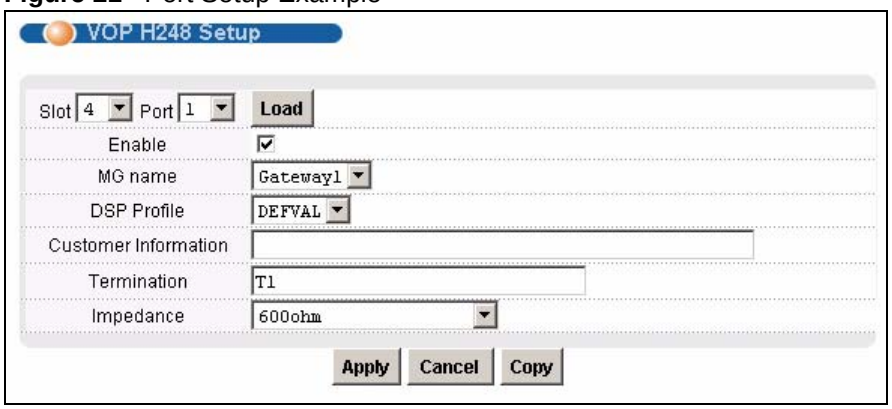

**3 Set up the line card's ports to use the correct virtual MG and Termination names.**

Use the **Port** > **VoIP H248** screen (see Section 11.24 on page 254).

- Select the **Slot** in which you installed the H.248-enabled VoIP line card. Select the first **Port** you wish to configure.

- Select **Enable**.
- Select the correct **MG name** (**Gateway1** in this example)
- Enter the **Termination** name for this port (**T1** in this example). This must correspond with the information on the MGC.
- Click **Apply**.
- Either configure the other ports in the same way, or use the **Copy** function in the screen.

**Figure 21** Port Setup Example




4 Lastly, test your configuration by making a call from a phone connected to one of the ports you configured. Alternatively, use the `show linestat <slot-port>` command to check whether the relevant port is successfully registered with the MGC (the state should be “idle”).

# 5

# Access Control List Screens

This chapter describes the ACL (Access Control List) screens.

## 5.1 DHCP Relay Overview

DHCP (Dynamic Host Configuration Protocol, RFC 2131 and RFC 2132) allows individual clients to obtain TCP/IP configuration at start-up from a DHCP server. You can configure the system to relay client TCP/IP configuration requests to a DHCP server and the server's responses back to the clients.

You can configure the system to forward client DHCP requests from different VLANs to specific DHCP servers.

### 5.1.1 DHCP Relay Agent Information Option (Option 82)

The system can add information to DHCP requests that it relays to a DHCP server. This helps provide authentication about the source of the requests. You can also specify additional information for the system to add to the DHCP requests that it relays to the DHCP server. Please refer to RFC 3046 for more details.

The DHCP relay agent information feature adds an Agent Information field to the option 82 field of the DHCP headers of client TCP/IP configuration request frames that the management switch card relays to a DHCP server. The MSC1000G supports two formats for the DHCP relay agent information: Private and TR-101.

### 5.1.2 Private Format

The DHCP relay agent information feature adds an Agent Information field to the option 82 field of the DHCP headers of DHCP request frames that the MSC1000G relays to a DHCP server. The Agent Information field that the MSC1000G adds contains an “Agent Circuit-ID sub-option” that includes the slot and port numbers, VLAN ID and optional information about the slot and port on which the DHCP request was received.

The following table shows the format of the private Agent Circuit ID sub-option. The (binary) “1” in the first field identifies this as an Agent Circuit ID sub-option. The length **N** gives the total number of octets in the Agent Information Field. If the configuration request was received on a DSL port, a 1-byte **Slot No** field specifies the ingress slot number, and a 1-byte

**Port No** field specifies the ingress port number (both in hexadecimal format). The next field is 2 bytes and displays the DHCP request packet's VLAN ID. The last field (**A**) can range from 1 to 24 bytes (including a one-byte termination character) and is optional information (that you specify) about this relay agent.

**Table 7** DHCP Relay Agent Circuit ID Sub-option Format: Private

| 1 | N | Slot No | Port No | VLAN ID | A |
|---|---|---|---|---|---|

The Agent Information field that the MSC1000G adds also contains an "Agent Remote-ID sub-option" of information that you specify.

The following table shows the format of the private Agent Remote ID sub-option. The "2" in the first field identifies this as an Agent Remote ID sub-option. The length **N** gives the total number of octets in the Agent Information Field. Next, the extra information field (**A** in the table) contains from 0 to 23 bytes of optional information (that you specify) with no spaces and no termination character (if you do not specify any information, this field contains no data). Next, there is a space and the letters "eth" followed by another space. Then there is the slot number and port number (in plain text format) upon which the DHCP client request was received. This is followed by a colon (:), the VLAN ID (VID) number, a period (.) and the MAC address (in hexadecimal format).

**Table 8** DHCP Relay Agent Remote ID Sub-option Format: Private

| 2 | N | A | "eth " | Slot No. | / | Port No. | : | VLAN ID | . | MAC |
|---|---|---|---|---|---|---|---|---|---|---|

## 5.1.3 TR-101 Format

The Agent Information field that the management switch card adds contains an "Agent Circuit-ID sub-option" that includes the system name or IP address, slot ID, port number, VPI, and VCI on which the TCP/IP configuration request was received.

The following figure shows the format of the TR-101 Agent Circuit ID sub-option. The 1 in the first field identifies this as an Agent Circuit ID sub-option. The next field specifies the length of the field. The hostname field displays the system name, if it has been configured, the extra information field (A) if the hostname was not configured, or the IP address in dotted decimal notation (w.x.y.z), if neither the system name nor the extra information field was been configured. In either case, the hostname is truncated to 23 characters, and trailing spaces are discarded. The hostname field is followed by a space, the string "atm", and another space. Then, a 1-byte Slot ID field specifies the ingress slot number, and a 1-byte Port No field specifies the ingress port number. Next, the VPI and VCI denote the virtual circuit that received the DHCP request message from the subscriber. If the VID is turned on, there is a colon and then the VLAN ID (1 ~ 4094). If the VID is turned off, there is neither colon nor VID.

The slot ID, port number, VPI, VCI and MAC are separated from each other by a forward slash (/) colon (:) or period (.). An example is "SYSNAME atm 3/10:0.33:12".

**Table 9** DHCP Relay Agent Circuit ID Sub-option Format: TR-101 (VID on)

| 1 | N | hostname / A / IP | "atm " | Slot ID | / | Port No. | : | VPI | . | VCI | : | VLAN ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Table 10** DHCP Relay Agent Circuit ID Sub-option Format: TR-101 (VID off)

| 1 | N | hostname / A / IP | "atm " | Slot ID | / | Port No. | : | VPI | . | VCI |
|---|---|---|---|---|---|---|---|---|---|---|

TR-101 uses the same remote ID sub-option format as the Private format.

## 5.1.4 PPPoE Intermediate Agent

You must use CLI commands to configure this feature.

This section describes how the MSC1000G gives a PPPoE termination server additional information that the server can use to identify and authenticate a PPPoE client.

If the PPPoE Intermediate Agent is enabled, the MSC1000G adds a vendor-specific tag to PADI (PPPoE Active Discovery Initialization) and PADR (PPPoE Active Discovery Request) packets from PPPoE clients. This tag is defined in RFC 2516 and has the following format for this feature.

**Table 11** PPPoE Intermediate Agent Vendor-specific Tag Format

| Tag_Type (0x0105) | Tag_Len | Value | i1 | i2 |
|---|---|---|---|---|

The Tag_Type is 0x0105 for vendor-specific tags, as defined in RFC 2516. The Tag_Len indicates the length of Value, i1 and i2. The Value is the 32-bit number 0x00000DE9, which stands for the "ADSL Forum" IANA entry. i1 and i2 are PPPoE intermediate agent sub-options, which contain additional information about the PPPoE client. The MSC1000G supports two formats for the PPPoE intermediate agent sub-options: private and TR-101.

### 5.1.4.1 Private Format

There are two types of sub-option: "Agent Circuit ID Sub-option" and "Agent Remote ID Sub-option". They have the following formats.

**Table 12** PPPoE Intermediate Agent Vendor-specific Tag Format

| SubOpt (0x01) | Length | Slot ID (1 byte) | Port No (1 byte) | VLAN ID (2 bytes) | Extra Information (0~23 bytes) |
|---|---|---|---|---|---|

**Table 13** PPPoE Intermediate Agent Remote ID Sub-option Format

| SubOpt (0x02) | Length | MAC (6 bytes) |
|---|---|---|

The MSC1000G adds the slot ID of the PPPoE client, the port number of the PPPoE client, the VLAN ID on the PPPoE packet, and any extra information (for example, the device name) into the Agent Circuit ID Sub-option. In addition, the MSC1000G puts the PPPoE client's MAC address into the Agent Remote ID Sub-option. The slot ID is zero, if this value is not applicable. If the MSC1000G adds extra information, it does not append a trailing 0x00 (00h).

### 5.1.4.2 TR-101 Format

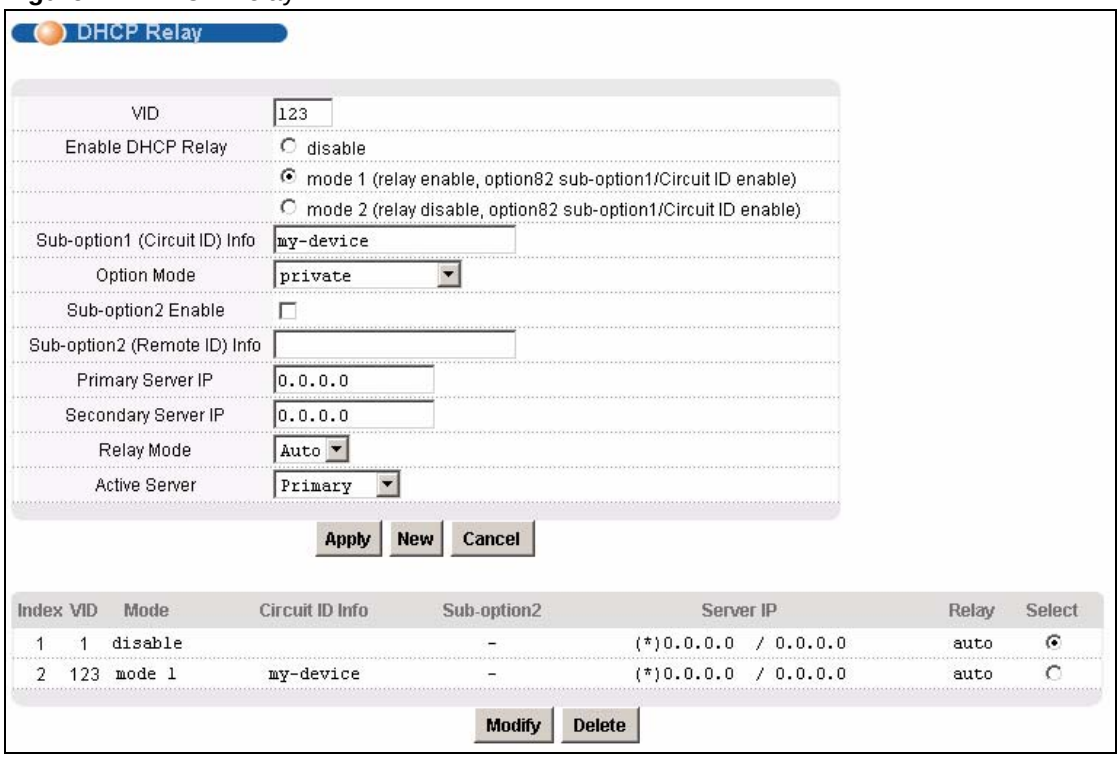
This format is the same as the TR-101 format for DHCP relay option 82; see Section 5.1.3 on page 92 for more information.

Unlike the private format for PPPoE intermediate agent, the TR-101 format for PPPoE intermediate agent does not include the Remote ID Sub-option.

## 5.2 DHCP Relay Screen

Click **ACL** > **DHCP Relay** to display the screen shown next.

**Figure 22** DHCP Relay




The following table describes the labels in this screen.

**Table 14** DHCP Relay

| LABEL | DESCRIPTION |
|---|---|
| VID | Enter a VLAN ID (between 1 and 4094) to be served with DHCP relay. |
| Enable DHCP Relay | Select **disable** to deactivate the DHCP relay service in this VLAN.<br>Select **mode 1** to activate DHCP relay service and have the MSC1000G add the originating port numbers, VLAN ID and additional information (if configured) to the client DHCP requests for this VLAN.<br>Select mode 2 to disable DHCP relay service but have the MSC1000G add the originating port numbers, VLAN ID and additional information (if configured) to the client DHCP requests. Before broadcasting, the MSC1000G adds the originating port numbers, VLAN ID and additional information (if configured) to DHCP requests. |
| Sub-option1 (Circuit ID) Info | Use this field to specify up to 23 English keyboard characters of additional information for the MSC1000G to add to the DHCP requests that it relays to a DHCP server.<br>Examples of information you could add would be the name of the MSC1000G or the ISP. |
| Option Mode | Use this field to select the method (private or TR-101) in which DHCP relay information is sent. With TR-101 you also have the option to include the VLAN ID.<br>Select **private** to use the private method to encode the DHCP relay information.<br>Select **tr101** to use TR-101 to encode the DHCP relay information.<br>Select **tr101** to use TR-101 to encode the DHCP relay information.<br>See Section 5.1.1 on page 91 for more on these modes. |

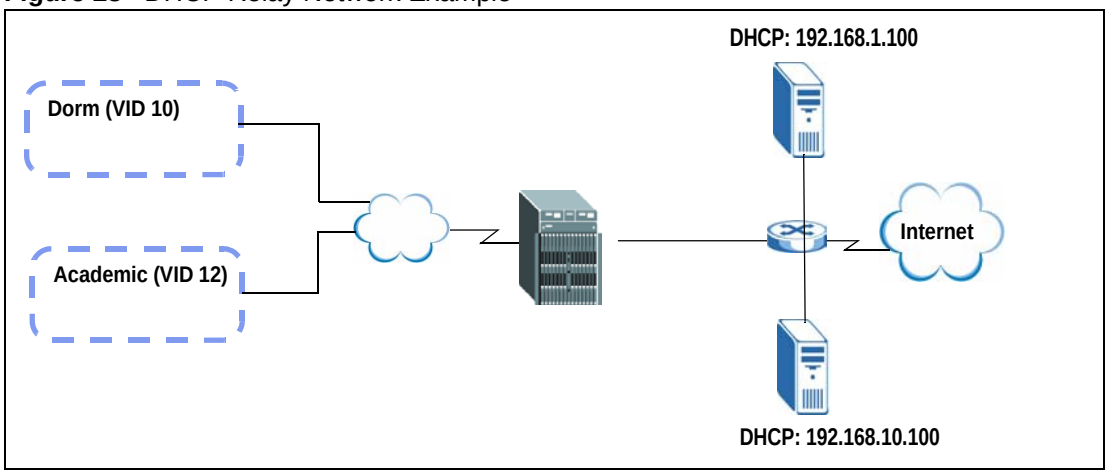
**Table 14** DHCP Relay (continued)

| LABEL | DESCRIPTION |
|---|---|
| Sub-option2 Enable | Select this option to have the MSC1000G add the sub-option 2 (Remote ID) to the client DHCP requests for this VLAN. |
| Sub-option2 (Remote ID) Info | Use this field to specify up to 23 English keyboard characters of additional information for the MSC1000G to add to the DHCP requests that it relays to a DHCP server.<br>This field is configurable only when you select **Sub-option2 Enable**. |
| Primary/ Secondary Server IP | Enter the IP addresses of the remote DHCP servers to which the switch should relay DHCP requests. |
| Relay Mode | Select **Auto** to have the system send DHCP requests to the active DHCP server first. If the active DHCP server does not respond, the system sends the DHCP request to the other DHCP server which then becomes the active DHCP server.<br>Select **Both** to have the switch send DHCP requests to both the primary and secondary DHCP servers. |
| Active Server | Specify to which DHCP server (**Primary** or **Secondary**) the system is to forward this VLAN's DHCP request first. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | Click **New** to create a new DHCP relay entry. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |
| Index | This is the index number of an entry. |
| VID | This is the ID number of the VLAN group. |
| Mode | This field displays whether the DHCP relay setting is activated or not. |
| Circuit ID Info | This field displays the sub-option 1 information to add to the DHCP request packets. |
| Sub-option2 | This field displays whether information (configured in the **Sub-option 2 Info** field) will be included in the client DHCP requests for this VLAN or not (**V** for enabled, **-** for disabled). |
| Server IP | This is the IP address of the primary/secondary DHCP server.<br>An asterisk in parentheses (*) indicates which DHCP server is active for each VLAN. |
| Relay | This field displays the DHCP relay mode. |
| Select | Select an entry's **Select** check box and click **Delete** to remove the entry or click **Modify** to edit the entry. |
| Modify | Click **Modify** to change the settings of the selected entry. |
| Delete | Click **Delete** to remove the selected entries. |

## 5.2.1 Example: DHCP Relay for Two VLANs

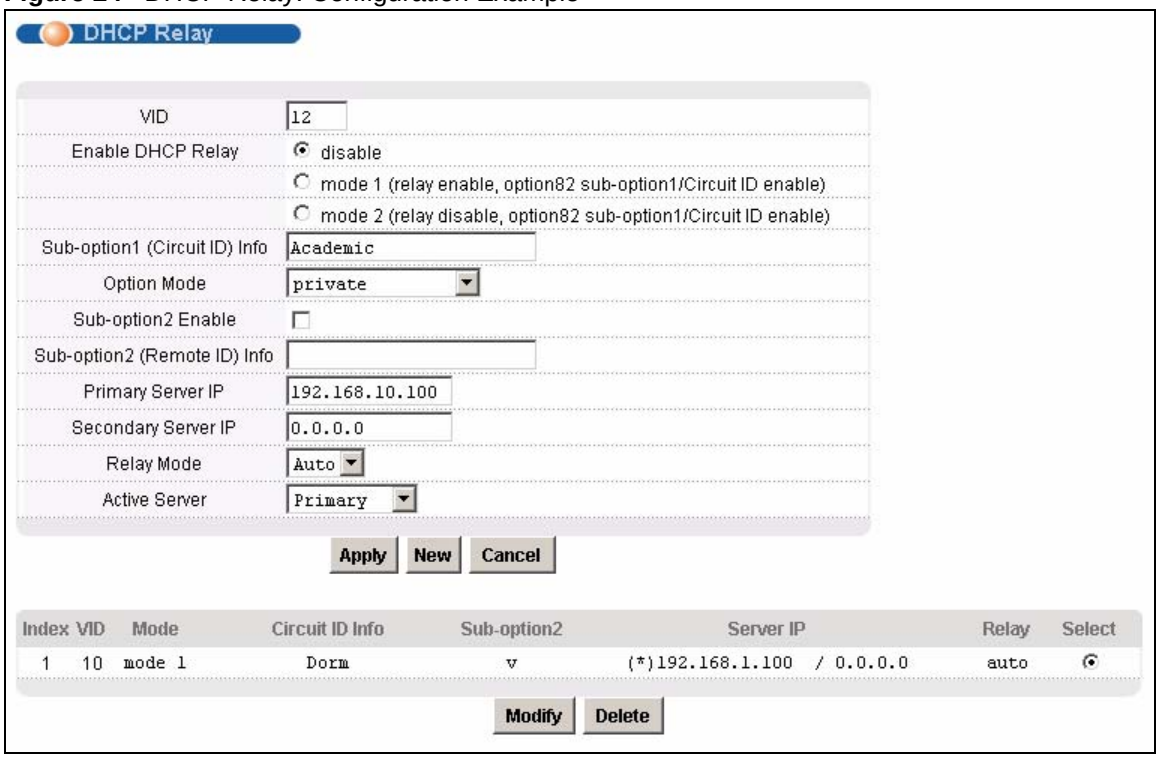
The following example displays two VLANs (VIDs10 and 12) for the campus network. Two DHCP servers are installed to serve each VLAN. The system is set up to forward DHCP requests from the dormitory rooms (VLAN 10) to the DHCP server with an IP address of 192.168.1.100. Requests from the academic buildings (VLAN 12) are sent to the other DHCP server with an IP address of 172.168.10.100.

**Figure 23** DHCP Relay Network Example




For the example network, configure the **DHCP Relay** screen as shown.

**Figure 24** DHCP Relay: Configuration Example



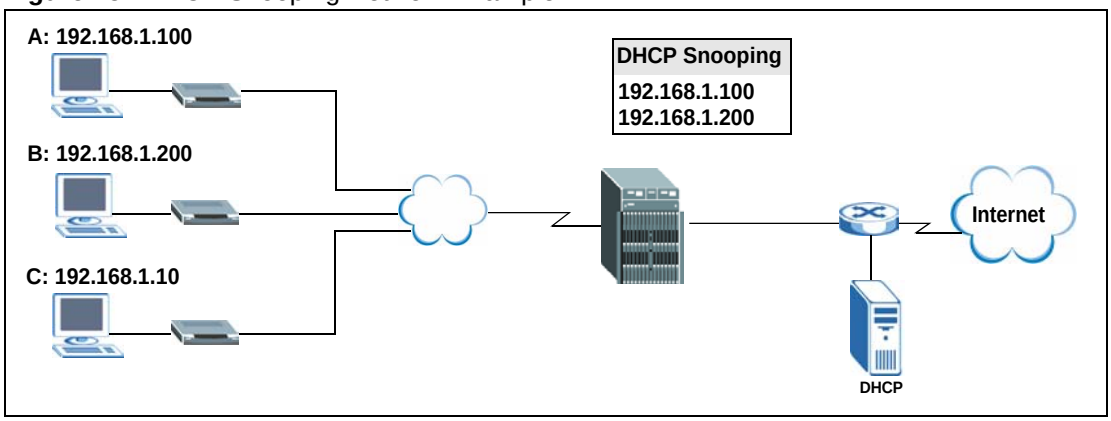

## 5.3 DHCP Snooping

With DHCP snooping, the system obtains a client's MAC-IP address information (in the reply messages from a DHCP server) and stores it in the DHCP snooping table. Frames with known source IP addresses are allowed to go through the subscriber ports. Frames from unknown IP addresses are dropped. This feature prevents subscribers from assigning their own static IP addresses that may conflict with a DHCP-assigned IP address.

You can also specify static IP addresses (for a subscriber given a static IP address) on a subscriber port. This is useful when service providers assign static WAN IP addresses to some subscribers. This static binding allows the switch to forward frames with the specified IP addresses.

In the following network example, the DHCP snooping table on the switch contains two source IP addresses: 192.168.1.100 (DHCP-assigned) and 192.168.1.200 (static). Traffic from computers **A** and **B** is allowed to go through the DSL ports. While traffic from computer **C** is blocked since its IP address is unknown to the switch (not in the DHCP snooping table).

**Figure 25** DHCP Snooping Network Example



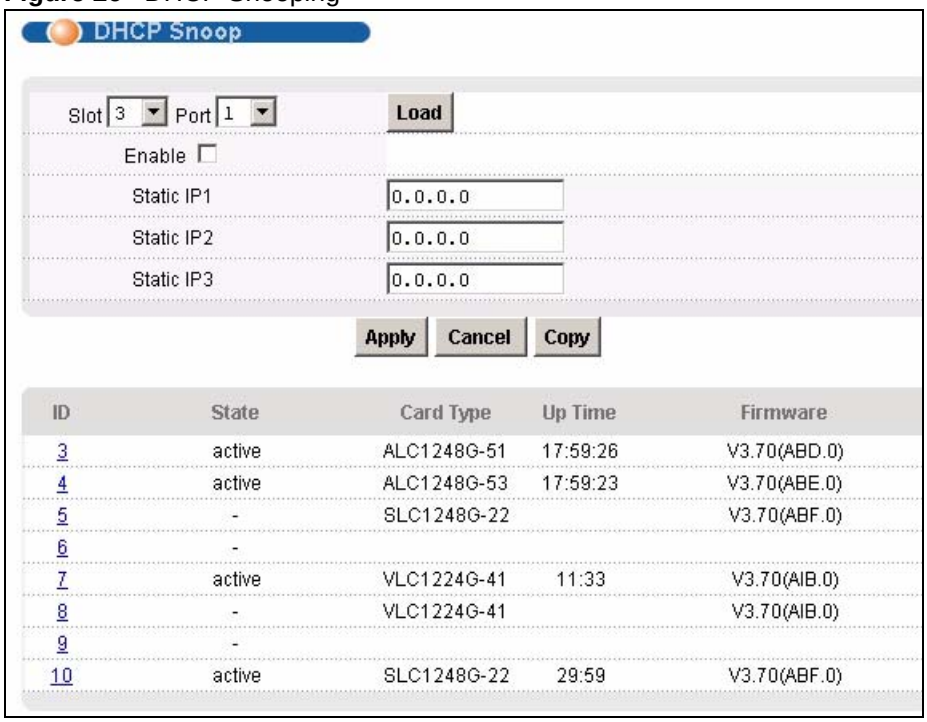

### 5.3.1 Anti-IP Address Spoofing

While performing DHCP snooping, a line card records which IP address is assigned to each DHCP client MAC address.  and which VLAN the client uses. The line card drops packets from a device using an IP address that is assigned to a different MAC address.

## 5.4 DHCP Snooping Configuration

Click **ACL > DHCP Snoop** to display the screen shown next.

**Figure 26** DHCP Snooping

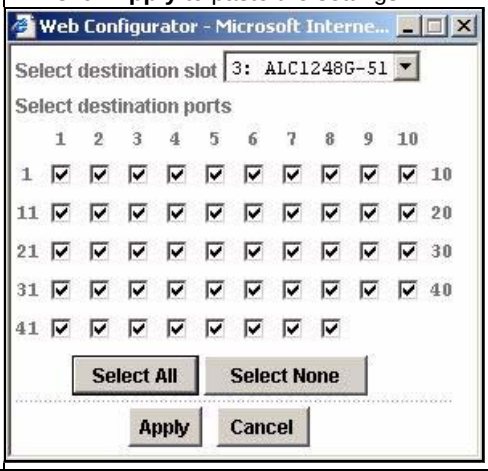



The following table describes the labels in this screen.

**Table 15** DHCP Snooping

| LABEL | DESCRIPTION |
|---|---|
| Slot<br>Port | Use the drop-down list boxes to select a DSL port on a line card for which you want to configure DHCP snooping. |
| Load | Click **Load** to display the port's current settings. |
| Enable | Select the check box to activate DHCP snooping on the specified DSL port. |
| Static IP1 .. 3 | Specify the static IP addresses of frames you want the switch to allow passage on the port.<br>Enter the IP address in dotted decimal notation. For example, 192.168.1.100.<br><br>Note: Make sure the specified static IP addresses are not in the DHCP client pool on the DHCP server. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

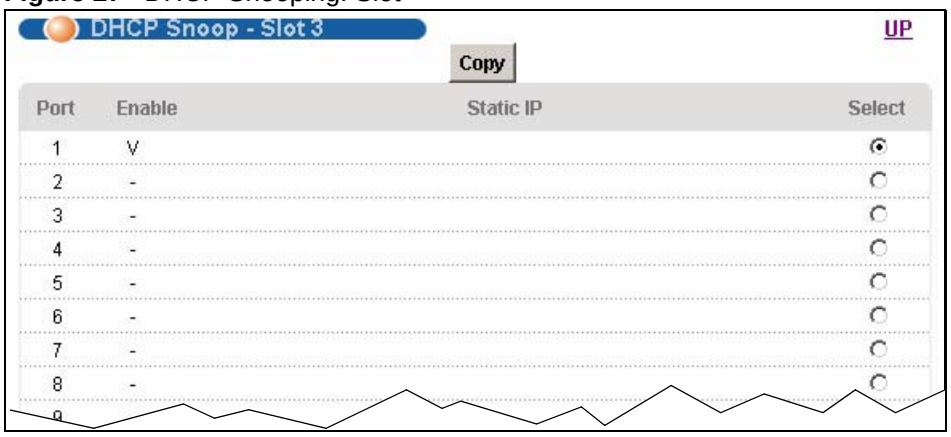
**Table 15** DHCP Snooping (continued)

| LABEL | DESCRIPTION |
|---|---|
| Copy | Do the following to copy the settings you configure above to another port or ports.<br>1. Click **Copy**.<br>2. Select to which line card you want to copy the settings.<br>3. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>4. Click **Apply** to paste the settings.<br>  |
| ID | This is the slot number of a line card. Click the index number of an active line card to display the **DHCP Snoop Slot** screen where you can view and copy settings from one port to another port or ports on the selected line card. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 5.4.1 DHCP Snooping Slot Screen

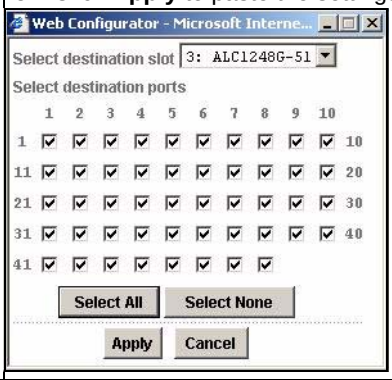
Click the slot number of an active line card in the **DHCP Snoop** screen to display the screen shown next.

**Figure 27** DHCP Snooping: Slot




The following table describes the labels in this screen.

**Table 16** DHCP Snooping: Slot

| LABEL | DESCRIPTION |
|---|---|
| UP | Click **UP** to go back to the previous screen. |
| Copy | Do the following to copy settings from one port to another port or ports.<br>1. Select the **Select** radio button of the port from which you want to copy settings<br>2. Click **Copy**.<br>3. Select to which line card you want to copy the settings.<br>4. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>5. Click **Apply** to paste the settings.<br>  |
| Port | This field displays the number of the DSL port. |
| Enable | This field displays whether DHCP snooping is activated on the specified DSL port or not (**V** for enabled, **-** for disabled). |
| Static IP | This field displays the static IP addresses in the DHCP snooping table for a port. |
| Select | Select the radio button of the port from which you want to copy settings. |

## 5.4.2 Example: DHCP Snooping

The following figures show the DHCP snooping configuration for computers **A** and **B** in the example network shown in Figure 25 on page 97. In this example, the line card in slot 3 has computer **A** connected to DSL port 1 and computer **B** connected to DSL port 10.

**Figure 28** DHCP Snooping: Computer A Example

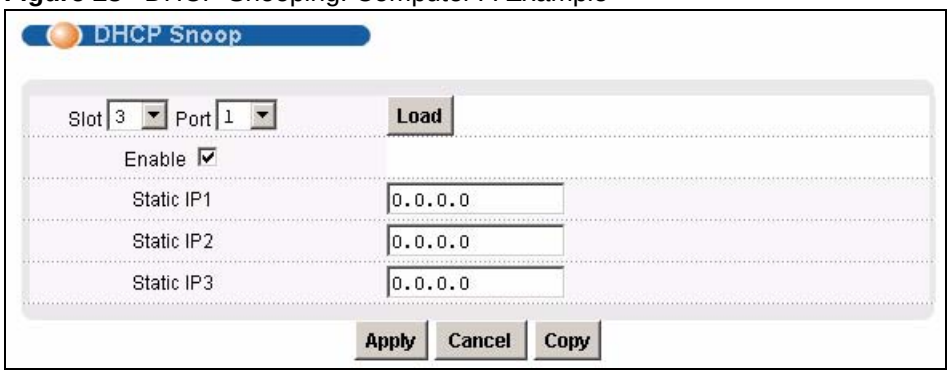
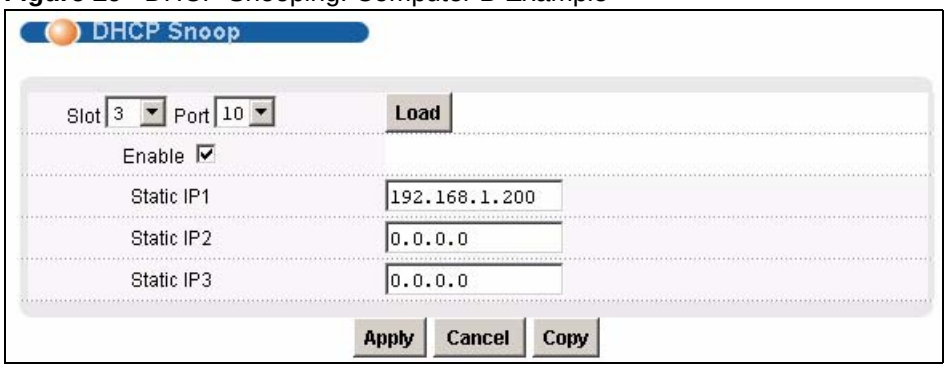



**Figure 29** DHCP Snooping: Computer B Example

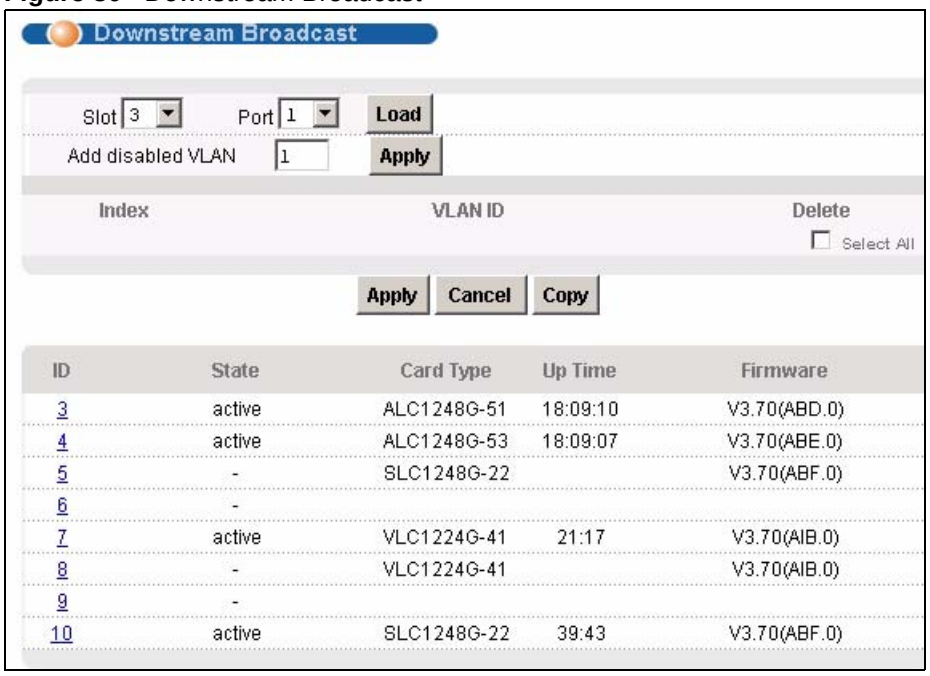



## 5.5 Downstream Broadcast Screen

Downstream broadcast allows you to block downstream broadcast packets from being sent to specified VLANs on specified ports. This helps to reduce downstream bandwidth requirements on a subscriber line.

Click **ACL > Downstream Broadcast** to display the screen shown next.

**Figure 30** Downstream Broadcast

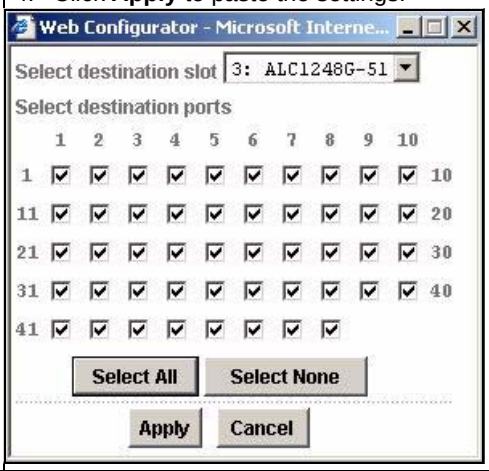



The following table describes the labels in this screen.

**Table 17** Downstream Broadcast

| LABEL | DESCRIPTION |
|---|---|
| Slot<br>Port | Use the drop-down list boxes to select an DSL port on an active line card for which you want to configure downstream broadcast blocking. |
| Load | Click **Load** to display the port's current settings. |
| Add disabled VLAN | Specify the number of a VLAN (on this port) to which you do not want to send broadcast traffic.<br><br>Note: The VLAN must already be configured in the system and the port must be one of its members already |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Index | This is the number of the downstream broadcast blocking entry. |
| VLAN ID | This field displays the number of a VLAN to which you do not want to send broadcast traffic (through the specified port). |
| Delete | Select one or more entries' check boxes and then use the **Apply** button to remove it (or them). Use the **Select All** check box to select all of the entries for the specified line card's port. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

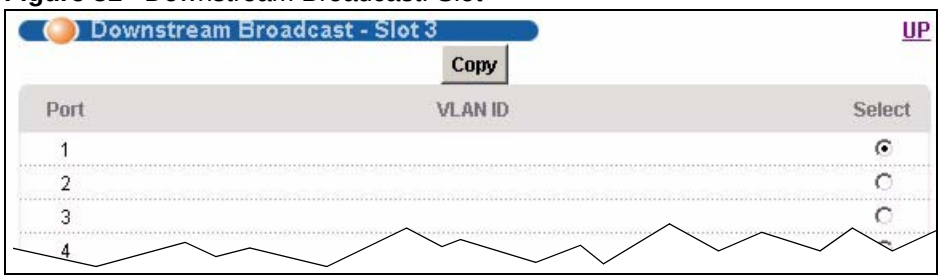
**Table 17** Downstream Broadcast (continued)

| LABEL | DESCRIPTION |
|---|---|
| Copy | Do the following to copy the settings you configure above to another port or ports.<br>1. Click **Copy**.<br>2. Select to which line card you want to copy the settings.<br>3. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>4. Click **Apply** to paste the settings.<br>  |
| ID | This is the slot number of a line card. Click the index number of an active line card to display the **Bandwidth Broadcast Slot** screen where you can view and copy settings from one port to another port or ports on the selected line card. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 5.5.1 Downstream Broadcast Slot Screen

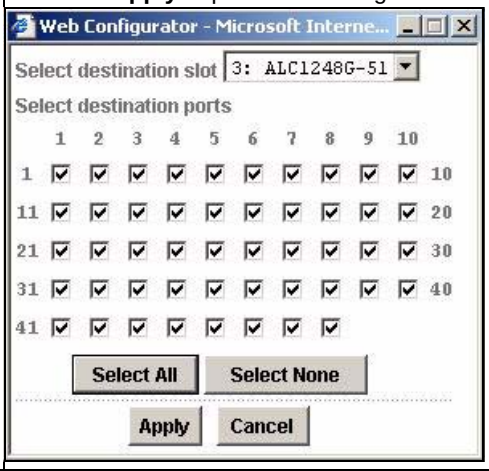
Click the slot number of an active line card in the **Downstream Broadcast** screen to display the screen shown next.

**Figure 31** Downstream Broadcast: Slot




The following table describes the labels in this screen.

**Table 18** Downstream Broadcast: Slot

| LABEL | DESCRIPTION |
|---|---|
| UP | Click **UP** to go back to the previous screen. |
| Copy | Do the following to copy settings from one port to another port or ports.<br>1. Select the **Select** radio button of the port from which you want to copy settings<br>2. Click **Copy**.<br>3. Select to which line card you want to copy the settings.<br>4. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>5. Click **Apply** to paste the settings.<br>  <br> |
| Port | This field displays the number of the DSL port. |
| VLAN ID | This field displays the number of a VLAN to which you do not want to send broadcast traffic (through the specified port). |
| Select | Select the radio button of the port from which you want to copy settings. |

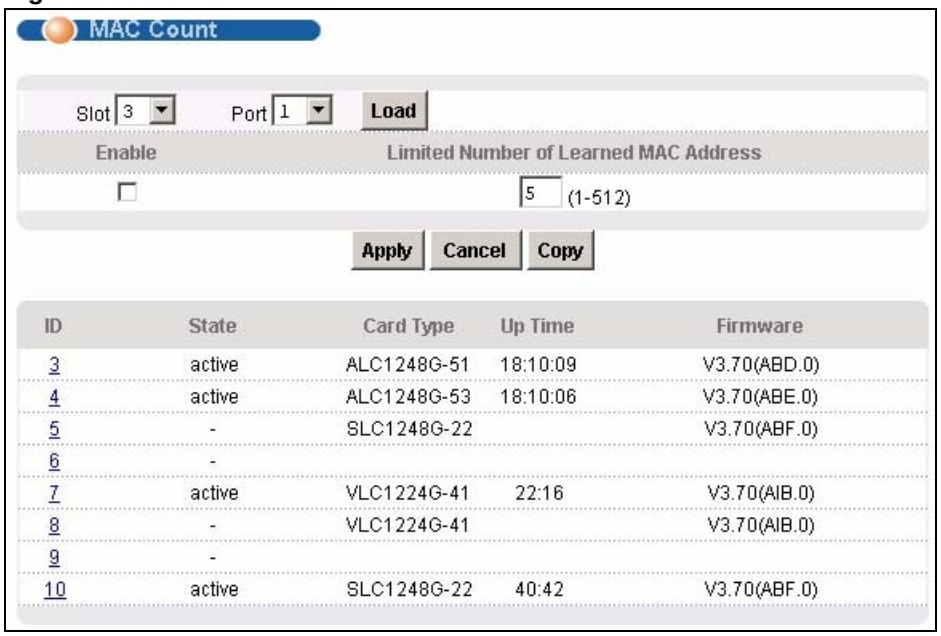
## 5.6 MAC Count Screen

This screen allows you to limit how many MAC addresses may be dynamically learned on a DSL port.

You cannot enable both MAC count and MAC filtering on the same port at the same time.

Click **ACL** > **MAC Count** to display the screen shown next.

**Figure 32** MAC Count

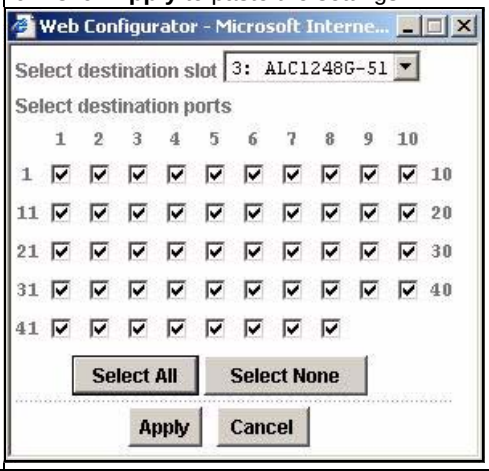



The following table describes the labels in this screen.

**Table 19** MAC Count

| LABEL | DESCRIPTION |
|---|---|
| Slot<br>Port | Use the drop-down list boxes to select an DSL port on a line card for which you want to configure the MAC count limit. |
| Load | Click **Load** to display the port's current settings. |
| Enable | Select the check box to activate the MAC count limit on the specified DSL port.<br>You can only enable the MAC count filter on DSL ports that do not have the MAC filter enabled. |
| Limited Number of Learned MAC Address | Specify how many MAC addresses the system can dynamically learn on this port. The range is 1~128.<br>For example, if you are configuring port 2 and you set this field to "5", then only five devices with dynamically learned MAC addresses may access port 2 at any one time. A sixth device would have to wait until one of the five learned MAC addresses ages out. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

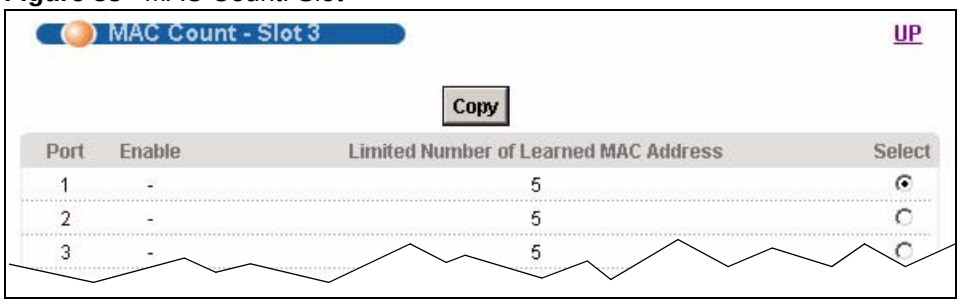
**Table 19** MAC Count (continued)

| LABEL | DESCRIPTION |
|---|---|
| Copy | Do the following to copy the settings you configure above to another port or ports.<br>6. Click **Copy**.<br>7. Select to which line card you want to copy the settings.<br>8. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>9. Click **Apply** to paste the settings.<br>  |
| ID | This is the slot number of a line card. Click the index number of an active line card to display the **MAC Count Slot** screen where you can view and copy settings from one port to another port or ports on the selected line card. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 5.6.1 MAC Count Slot Screen

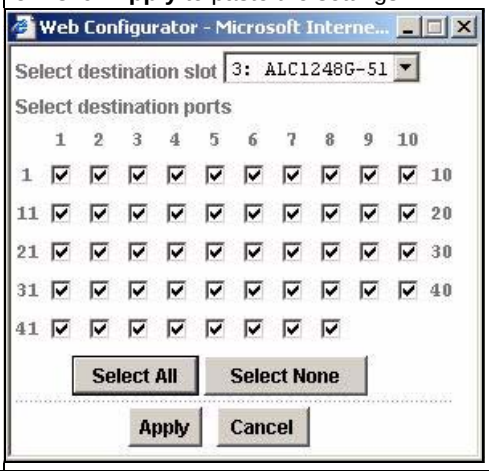
Click the slot number of an active line card in the **MAC Count** screen to display the screen shown next.

**Figure 33** MAC Count: Slot




The following table describes the labels in this screen.

**Table 20** MAC Count: Slot

| LABEL | DESCRIPTION |
|---|---|
| UP | Click **UP** to go back to the previous screen. |
| Copy | Do the following to copy settings from one port to another port or ports.<br>1. Select the **Select** radio button of the port from which you want to copy settings<br>2. Click **Copy**.<br>3. Select to which line card you want to copy the settings.<br>4. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>5. Click **Apply** to paste the settings.<br>  |
| Port | This field displays the number of the DSL port. |
| Enable | This field displays whether the MAC count limit is activated on the specified DSL port or not (**V** for enabled, **-** for disabled). |
| Limited Number of Learned MAC Address | This fields displays how many MAC addresses a port may dynamically learn. |
| Select | Select the radio button of the port from which you want to copy settings. |

## 5.7 MAC Filter Screen

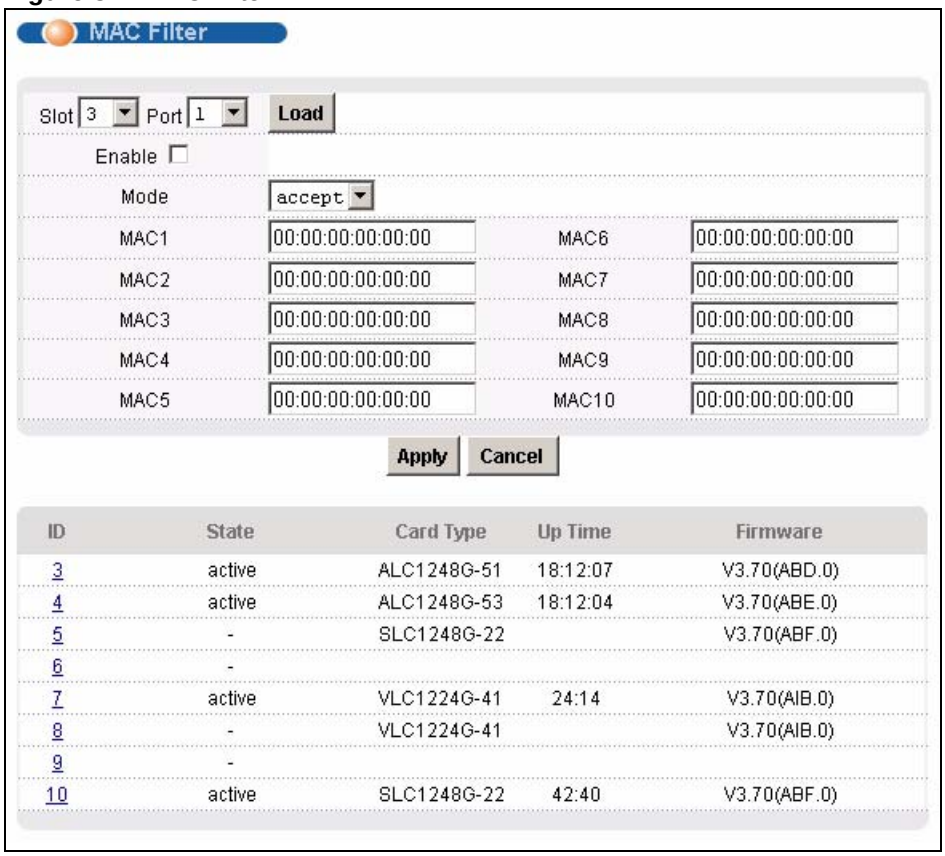
Use MAC filter to allow or block frames from MAC (Media Access Control) address(es) that you specify to come in through a port. You may specify up to ten MAC addresses per port.

You cannot enable both MAC filtering and MAC count on the same port at the same time.

You cannot enable both MAC filtering and OUI filtering at the same time.

Click **ACL** > **MAC Filter** to display the screen shown next.

**Figure 34** MAC Filter




The following table describes the labels in this screen.

**Table 21** MAC Filter

| LABEL | DESCRIPTION |
|---|---|
| Slot<br>Port | Use the drop-down list boxes to select an DSL port on a line card for which you wish to configure MAC filtering. |
| Load | Click **Load** to display the port's current settings. |
| Enable | Select the check box to turn on the MAC filtering feature on a line card's specified DSL port. |

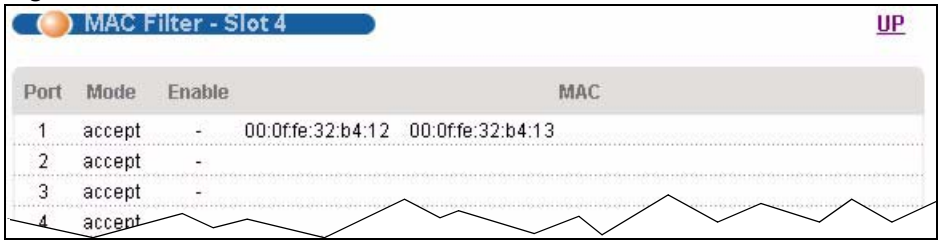
**Table 21** MAC Filter (continued)

| LABEL | DESCRIPTION |
|---|---|
| Mode | Select **accept** to only allow frames from MAC addresses that you specify and block frames from other MAC addresses.<br>Select **deny** to block frames from MAC addresses that you specify and allow frames from other MAC addresses. |
| MAC1~10 | Type a device's MAC address in hexadecimal notation (xx:xx:xx:xx:xx:xx, where x is a number from 0 to 9 or a letter from a to f) in this field. The MAC address must be a valid MAC address. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| ID | This is the slot number of a line card. Click the index number of an active line card to display the **MAC Filter Slot** screen where you can view MAC filtering settings on the specified line card. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 5.7.1 MAC Filter Slot Screen

Click the slot number of an active line card in the **MAC Filter** screen to display the screen shown next.

**Figure 35** MAC Filter: Slot




The following table describes the labels in this screen.

**Table 22** MAC Filter: Slot

| LABEL | DESCRIPTION |
|---|---|
| UP | Click **UP** to go back to the previous screen. |
| Port | This field displays the number of the DSL port. |
| Mode | This field displays the filter action. |

**Table 22** MAC Filter: Slot (continued)

| LABEL | DESCRIPTION |
|---|---|
| Enable | This field displays whether MAC filtering is activated on the specified DSL port or not (**V** for enabled, **-** for disabled). |
| MAC | This fields displays the MAC address(es) you set for the port. |

## 5.8 OUI Filter

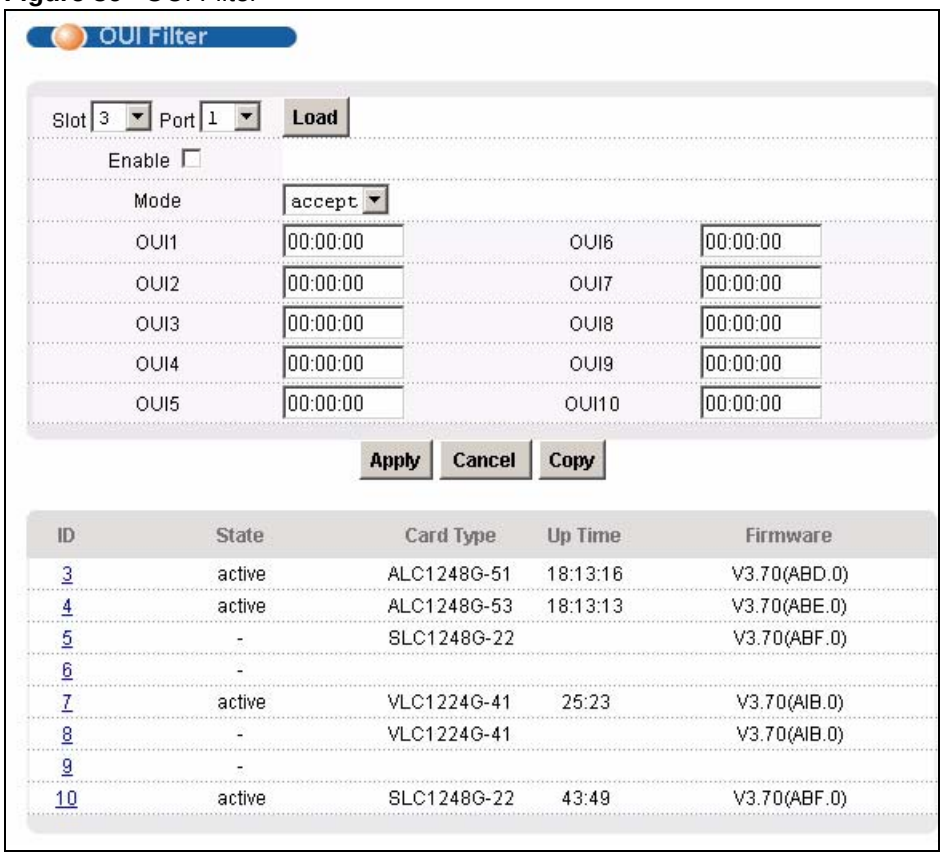
Configure an OUI (Organizationally Unique Identifier) filter to block or forward packets from devices with the specified OUI in the MAC address.

The OUI field is the first three octets in a MAC address. An OUI uniquely identifies the manufacturer of a network device and allows you to identify from which device brands the switch will accept traffic or send traffic to. The OUI value is assigned by the IANA.

Click **ACL** > **OUI Filter** to display the configuration screen.

You cannot enable both MAC filtering and OUI filtering at the same time.

**Figure 36** OUI Filter



The following table describes the labels in this screen.

**Table 23** OUI Filter

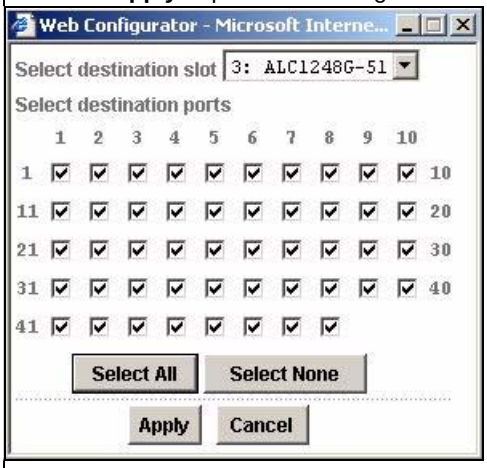
| LABEL | DESCRIPTION |
|---|---|
| Slot<br>Port | Use the drop-down list boxes to select an DSL port on a line card for which you wish to configure packet type filtering. |
| Load | Click **Load** to display the port's current settings. |
| Enable | Select **Enable** to activate this filter.<br>Clear this check box to disable the filter without deleting it. |
| Mode | Specify the action on matched frames.<br>Select **accept** to allow frames with a matched OUI field in the MAC addresses. The switch blocks frames with other OUIs not specified.<br>Select **deny** to block frames with a matched OUI field in the MAC addresses. The switch allows frames with other OUIs not specified. |
| OUI1.. 10 | Enter the first three octets of a MAC address in the format xx:xx:xx. For example, 00:0F:FE. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Copy | Do the following to copy the settings you configure above to another port or ports.<br>1. Click **Copy**.<br>2. Select to which line card you want to copy the settings.<br>3. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>4. Click **Apply** to paste the settings.<br>  |
| ID | This is the slot number of a line card. Click the index number of an active line card to display the **OUI Filter Slot** screen where you can view and copy settings from one port to another port or ports on the selected line card. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |

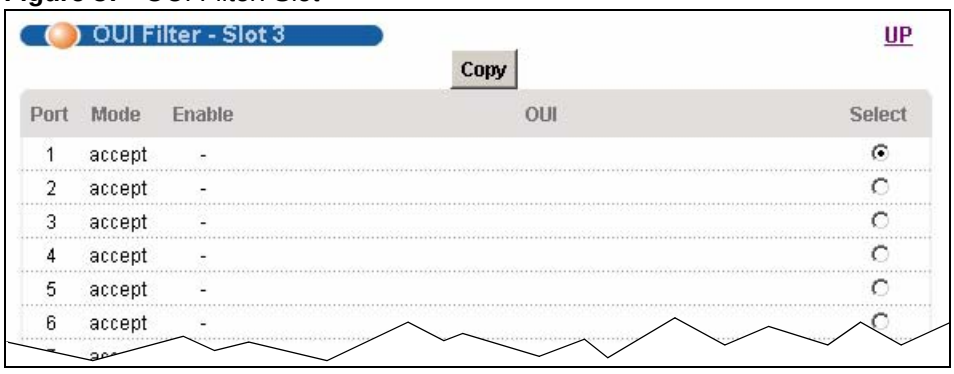
**Table 23** OUI Filter (continued)

| LABEL | DESCRIPTION |
|---|---|
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 5.8.1 OUI Filter Slot Screen

Click the slot number of an active line card in the **OUI Filter** screen to display the screen shown next.

**Figure 37** OUI Filter: Slot




The following table describes the labels in this screen.

**Table 24** OUI Filter: Slot

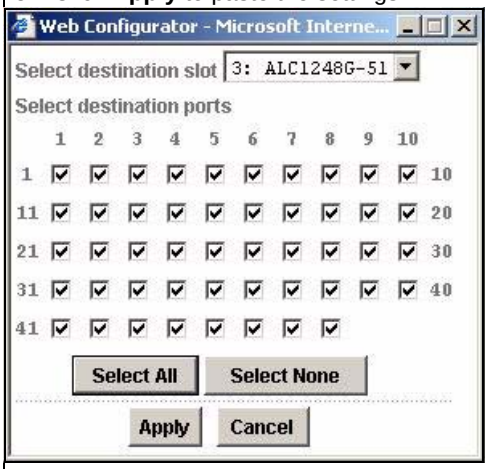
| LABEL | DESCRIPTION |
|---|---|
| UP | Click **UP** to go back to the previous screen. |
| Copy | Do the following to copy settings from one port to another port or ports.<br>1. Select the **Select** radio button of the port from which you want to copy settings<br>2. Click **Copy**.<br>3. Select to which line card you want to copy the settings.<br>4. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>5. Click **Apply** to paste the settings.<br>  <br> |
| Port | This field displays the number of the DSL port. |

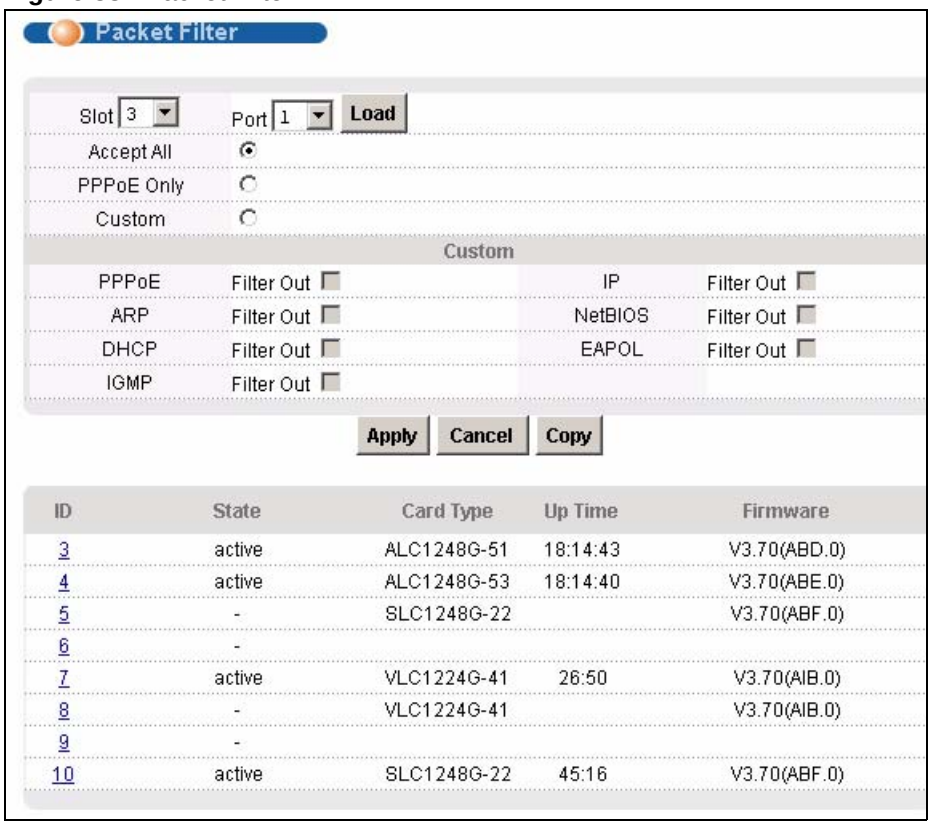
**Table 24** OUI Filter: Slot (continued)

| LABEL | DESCRIPTION |
|---|---|
| Mode | This field displays the filter mode (**deny** or **accept**). |
| Enable | This field displays whether OUI filtering is activated on the specified DSL port or not (**V** for enabled, **-** for disabled). |
| OUI | This field displays the OUI address to filter on a port. |
| Select | Select the radio button of the port from which you want to copy settings. |

## 5.9 Packet Filter Screen

Use this screen to set which types of packets the switch accepts on individual DSL ports. Click **ACL** > **Packet Filter** to display the screen shown next.

**Figure 38** Packet Filter




The following table describes the labels in this screen.

**Table 25** Packet Filter

| LABEL | DESCRIPTION |
|---|---|
| Slot<br>Port | Use the drop-down list boxes to select an DSL port on a line card for which you wish to configure packet type filtering. |
| Load | Click **Load** to display the port's current settings. |
| Select the radio buttons of the types of packets to accept on the ADSL port. | |
| Accept All | Select **Accept All** to allow any traffic. |

**Table 25** Packet Filter (continued)

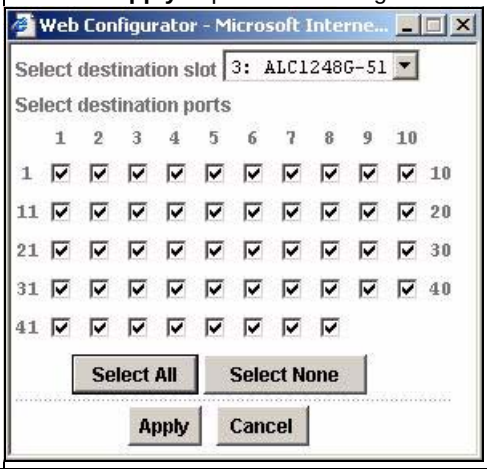
| LABEL | DESCRIPTION |
|---|---|
| PPPoE Only | Select **PPPoE Only** to allow only PPPoE traffic. This will gray out the check boxes for other packet types and the switch will drop any non-PPPoE packets. |
| Custom | Select **Custom** and specify which types of packets listed below will be blocked. |
| PPPoE Filter Out | Point-to-Point Protocol over Ethernet relies on PPP and Ethernet. It is a specification for connecting the users on an Ethernet to the Internet through a common broadband medium, such as a single DSL line, wireless device or cable modem. |
| IP Filter Out | Internet Protocol. The underlying protocol for routing packets on the Internet and other TCP/IP-based networks. |
| ARP Filter Out | Address Resolution Protocol is a protocol for mapping an Internet Protocol address (IP address) to a physical computer address that is recognized in the local network. |
| NetBIOS Filter Out | NetBIOS (Network Basic Input/Output System) are TCP or UDP packets that enable a computer to find other computers. |
| DHCP Filter Out | Dynamic Host Configuration Protocol (DHCP) automatically assigns IP addresses to clients when they log on. DHCP centralizes IP address management on central computers that run the DHCP server program. DHCP leases addresses, for a period of time, which means that past addresses are “recycled” and made available for future reassignment to other systems. |
| EAPOL Filter Out | EAP (Extensible Authentication Protocol, RFC 2486) over LAN. EAP is used with IEEE 802.1x to allow additional authentication methods (besides RADIUS) to be deployed with no changes to the access point or the wireless clients. |
| IGMP Filter Out | Internet Group Multicast Protocol is used when sending packets to a specific group of hosts. |
| Apply | Click **Apply** to save the changes in this screen to the system’s volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Copy | Do the following to copy the settings you configure above to another port or ports.<br>1. Click **Copy**.<br>2. Select to which line card you want to copy the settings.<br>3. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>4. Click **Apply** to paste the settings.<br>  |
| ID | This is the slot number of a line card. Click the index number of an active line card to display the **Packet Filter Slot** screen where you can view and copy settings from one port to another port or ports on the selected line card. |

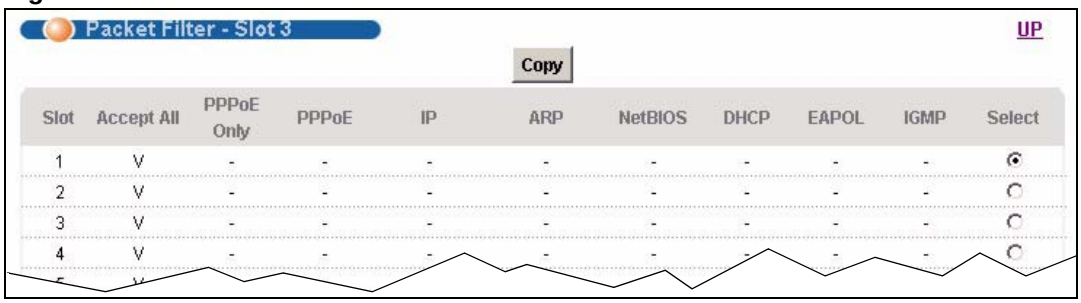
**Table 25** Packet Filter (continued)

| LABEL | DESCRIPTION |
|---|---|
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 5.10 Packet Filter Slot Screen

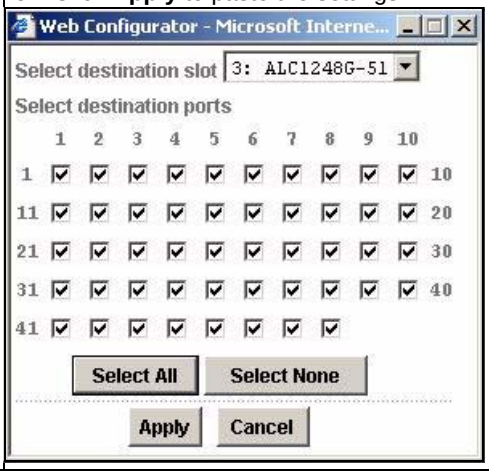
Click the slot number of an active line card in the **Packet Filter** screen to display the screen shown next.

**Figure 39** Packet Filter: Slot



The following table describes the labels in this screen.

**Table 26** Packet Filter: Slot

| LABEL | DESCRIPTION |
|---|---|
| UP | Click **UP** to go back to the previous screen. |
| Copy | Do the following to copy settings from one port to another port or ports.<br>1. Select the **Select** radio button of the port from which you want to copy settings<br>2. Click **Copy**.<br>3. Select to which line card you want to copy the settings.<br>4. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>5. Click **Apply** to paste the settings.<br>  |
| Slot | This field displays the number of the DSL port. |
| Accept All, PPPoE Only, PPPoE, IP, ARP, NetBIOS, DHCP, EAPOL, IGMP | These are the packet filter settings for each port.<br>**Accept All** and **PPPoE Only**: "V" displays for the packet types that the system is to accept on the port. "-" displays for packet types that the system is to reject on the port.<br>**PPPoE**, **IP**, **ARP**, **NetBIOS**, **DHCP**, **EAPOL** and **IGMP**: "V" displays for the packet types that the system is to reject on the port. "-" displays for packet types that the system is to accept on the port. |
| Select | Select the radio button of the port from which you want to copy settings. |

## 5.11 IEEE 802.1x

This section describes the IEEE 802.1x authentication method and RADIUS server connection setup.

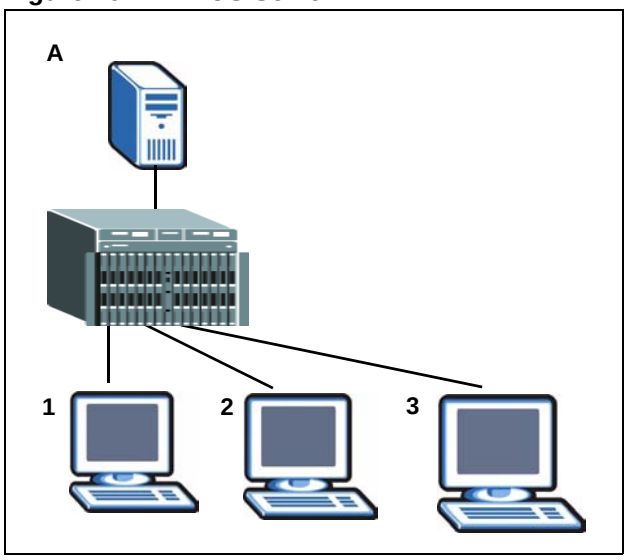
IEEE 802.1x is an extended authentication protocol[1] that allows support of RADIUS (Remote Authentication Dial In User Service, RFC 2138, 2139) for centralized user profile management on a network RADIUS server.

1. Not all Windows operating systems support IEEE 802.1x (see the Microsoft web site for details). For other operating systems, see its documentation. If your operating system does not support IEEE 802.1x, then you may need to install IEEE 802.1x client software.

### 5.11.1 RADIUS

RADIUS authentication is a popular protocol used to authenticate users by means of an external server instead of (or in addition to) an internal device user database that is limited to the memory capacity of the device. In essence, RADIUS authentication allows you to validate an unlimited number of users from a central location. In the following graphic, the RADIUS server (A) authenticates users 1, 2 and 3.

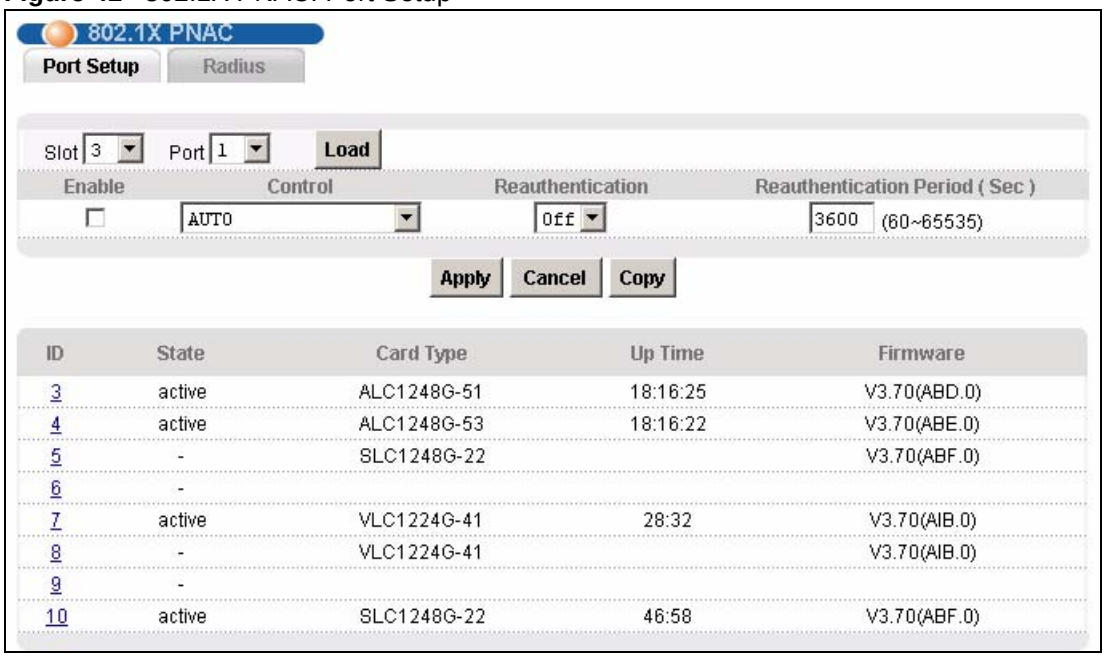
**Figure 40** RADIUS Server




## 5.12 802.1X PNAC Port Setup Screen

Click **ACL > 802.1X PNAC** to display the screen shown next. PNAC stands for Port-based Network Access Control. Use this screen to configure IEEE 802.1x settings.

**Figure 41** 802.1X PNAC: Port Setup

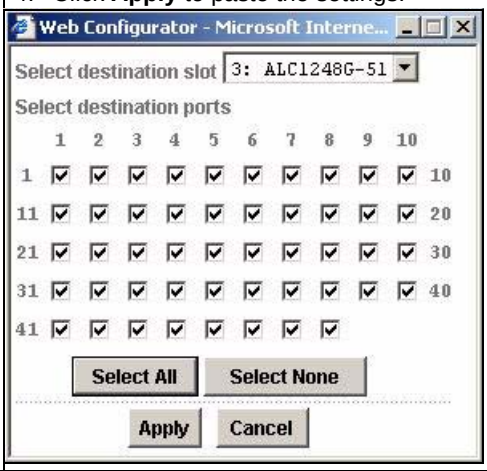



The following table describes the labels in this screen.

**Table 27** 802.1X PNAC: Port Setup

| LABEL | DESCRIPTION |
|---|---|
| Slot<br>Port | Use the drop-down list boxes to select an DSL port on a line card for which you wish to configure IEEE 802.1x authentication. |
| Load | Click **Load** to display the port's current settings. |
| Enable | Select this check box to turn on IEEE 802.1x authentication on the system. |
| Control | Select **AUTO** to authenticate all subscribers before they can access the network through this port.<br>Select **FORCE AUTHORIZED** to allow all connected users to access the network through this port without authentication.<br>Select **FORCE UNAUTHORIZED** to deny all subscribers access to the network through this port. |
| Reauthentication | Specify if a subscriber has to periodically re-enter his or her username and password to stay connected to the port. |
| Reauthentication Period(s) | Specify how often a client has to re-enter his or her username and password to stay connected to the port. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

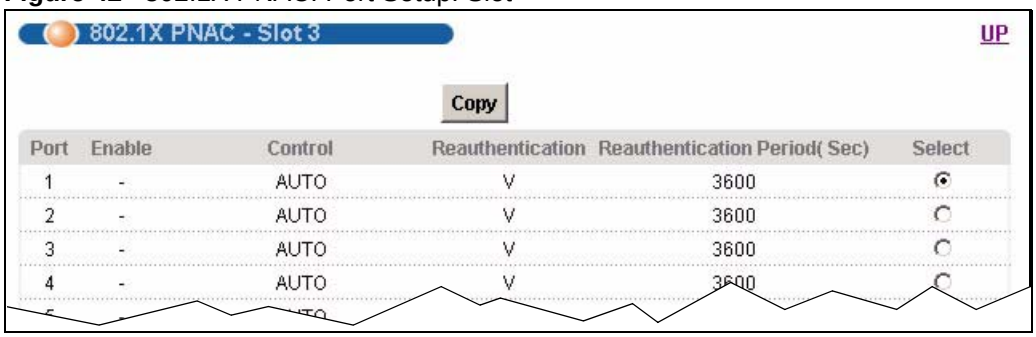
**Table 27** 802.1X PNAC: Port Setup (continued)

| LABEL | DESCRIPTION |
|---|---|
| Copy | Do the following to copy the settings you configure above to another port or ports.<br>1. Click **Copy**.<br>2. Select to which line card you want to copy the settings.<br>3. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>4. Click **Apply** to paste the settings.<br>  |
| ID | This is the slot number of a line card. Click the index number of an active line card to display the **802.1X PNAC Slot** screen where you can view and copy settings from one port to another port or ports on the selected line card. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 5.12.1 802.1X PNAC Slot Screen

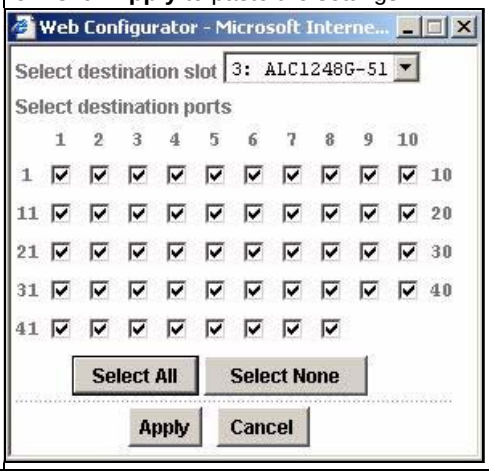
Click the slot number of an active line card in the **Port Setup** screen to display the screen shown next.

**Figure 42** 802.1X PNAC: Port Setup: Slot




The following table describes the labels in this screen.

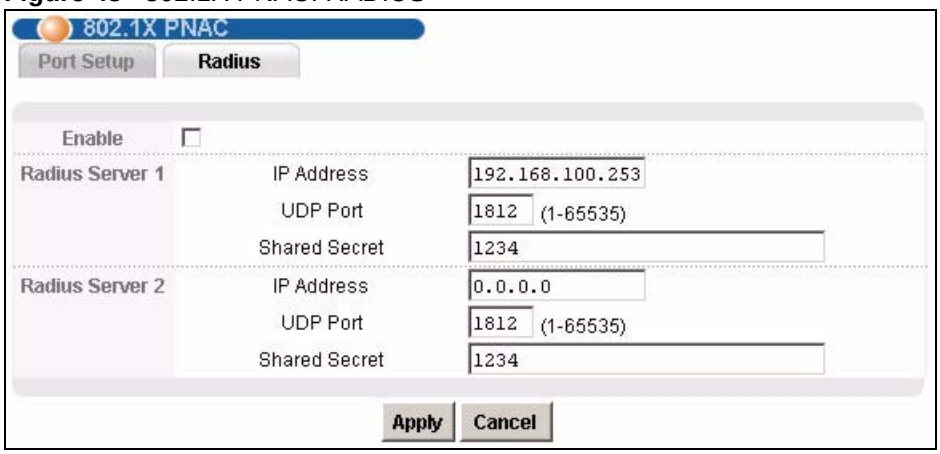
**Table 28** 802.1X PNAC: Port Setup: Slot

| label | description |
|---|---|
| UP | Click **UP** to go back to the previous screen. |
| Copy | Do the following to copy settings from one port to another port or ports.<br>1. Select the **Select** radio button of the port from which you want to copy settings<br>2. Click **Copy**.<br>3. Select to which line card you want to copy the settings.<br>4. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>5. Click **Apply** to paste the settings.<br>  |
| Port | This field displays the number of the DSL port. |
| Enable | This field displays whether IEEE 802.1x is turned on or not (**V** for enabled, **-** for disabled). |
| Control | This field displays the IEEE 802.1x port authentication option for a subscriber port. |
| Reauthentication | This field displays whether the IEEE 802.1x re-authentication option is turned on or not (V for enabled, - for disabled). |
| Reauthentication Period (Sec) | This field displays the IEEE 802.1x re-authentication period. |
| Select | Select the radio button of the port from which you want to copy settings. |

## 5.13 RADIUS Screen

Click **ACL** > **802.1X PNAC** > **RADIUS** to display the screen shown next.

**Figure 43** 802.1X PNAC: RADIUS




The following table describes the labels in this screen.

**Table 29** 802.1X PNAC: RADIUS

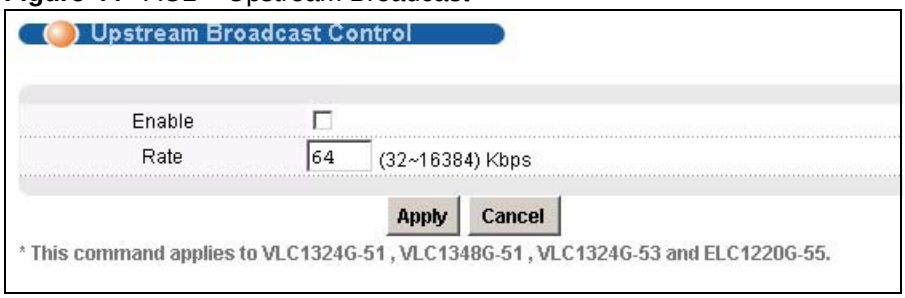
| LABEL | DESCRIPTION |
|---|---|
| Enable | Select this check box to have the switch use an external RADIUS server to authenticate users. |
| Radius Server 1/2 | |
| IP address | Enter the IP address of the external RADIUS server in dotted decimal notation. |
| UDP Port | The default port of the RADIUS server for authentication is **1812**. You need not change this value unless your network administrator instructs you to do so. |
| Shared Secret | Specify a password (up to 31 alphanumeric characters) as the key to be shared between the external RADIUS server and the system. This key is not sent over the network. This key must be the same on the external RADIUS server and the switch. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

## 5.14 Upstream Broadcast Control Screen

Upstream broadcast allows you to define the maximum bandwidth for upstream broadcast traffic allowed in each VDSL subscriber line. This is useful to reduce the incoming broadcast packets and system load.

Click **ACL > Upstream Broadcast** to display the screen shown next.

**Figure 44** ACL > Upstream Broadcast




The following table describes the labels in this screen.

**Table 30** ACL > Upstream Broadcast

| LABEL | DESCRIPTION |
|---|---|
| Enable | Click this to enable bandwidth control for upstream broadcast traffic. |
| Rate | Enter the maximum bandwidth for upstream broadcast traffic (in Kbps) allowed to flow into the line card from a subscriber line. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

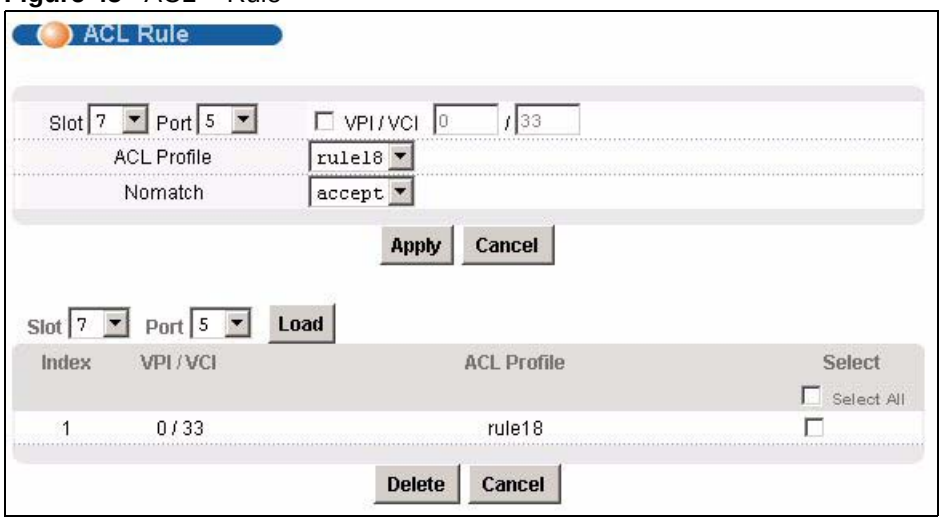
## 5.15 ACL Rule Screen

An ACL (Access Control Logic) profile allows the system to classify and allow or deny upstream traffic. An ACL profile applies to a PVC.

- Use the **Profile** > **ACL** screen (Section 12.22 on page 298) to configure the ACL profiles.
- Use the **ACL** > **Rule** screen (Section 5.15 on page 122) to apply the ACL profiles to PVCs.

Click **ACL** > **Rule** to display the screen shown next.

**Figure 45** ACL > Rule



The following table describes the labels in this screen.

**Table 31** ACL > Rule

| LABEL | DESCRIPTION |
|---|---|
| Slot<br>Port | Use the drop-down list boxes to select a DSL line card and port for which to apply ACL profiles to a PVC. |
| VPI/VCI | For an ALC or SLC port, select this check box and type the Virtual Path Identifier and Virtual Circuit Identifier for a channel on the port. |
| ACL Profile | Select the ACL profile to apply to the selected PVC. |
| Nomatch | Select whether to forward (**allow**) or drop (**deny**) traffic that does not match the ACL profile. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Slot<br>Port | Use the drop-down list boxes to select a DSL line card and port. |
| Load | Click **Load** to display the port's current settings. |
| Index | This is the index number of an entry. |
| VPI/VCI | For an ALC or SLC port, this field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI) |
| ACL Profile | This field displays the ACL profile the system applies to the PVC. |
| Select | Select this check box (or use **Select All** to select every check box) and then click the **Delete** button to remove an ACL profile from the PVC. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

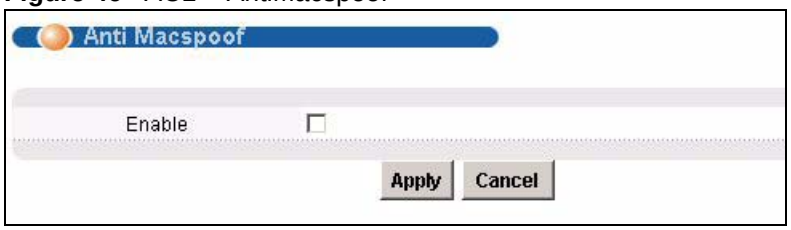
## 5.16 Anti-MAC Spoofing Screen

With anti-MAC spoofing enabled, a line card that detects MAC address spoofing (another device using a MAC address that is connected to another subscriber port on the system) disables the subscriber port where it detected the spoofed MAC address.

Click **ACL** > **AntiMacspoof** to display the screen shown next. Use this screen to enable or disable protection against MAC address spoofing.

A line card can detect MAC spoofing only when the spoofed MAC address is already in use by a device connected to another subscriber port.

**Figure 46** ACL > AntiMacspoof




The following table describes the labels in this screen.

**Table 32** ACL > AntiMacspoof

| LABEL | DESCRIPTION |
|---|---|
| Enable | Turn on anti-MAC spoofing to have the system check for hosts with fake or duplicated MAC addresses which attempt to access the system. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

# 5.17 DSCP Screens

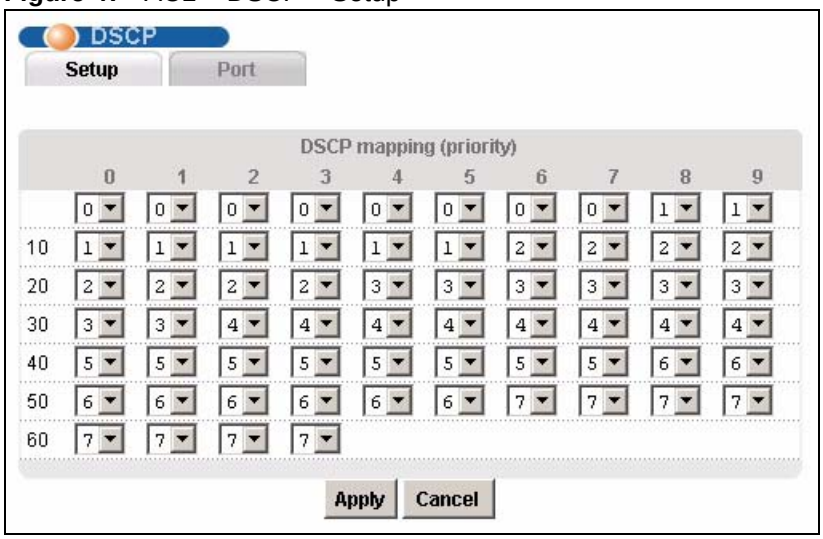
DSCP (Differentiated Services Code Point) is a field in the header of IP packets for packet classification purposes. The system's QoS (Quality-of-Service) uses DSCP to provide different level of services and priorities for downstream data transmission.

IEEE 802.1p lets the Device transmit frames according to their 3-bit priority (0~7) in an IEEE 802.1q header. Frames with higher priority are served first. This Device allows you to overwrite the DSCP level of service with an IEEE 802.1p priority for downstream traffic.

## 5.17.1 DSCP Setup Screen

Click **ACL** > **DSCP** > **Setup** to display the screen shown next. Use this screen to configure the mapping between DSCP code points and IEEE 802.1p priorities for subscribers. Use the **Switch** > **Switch Port Setup** > **DSCP** screen to configure the mapping for Gigabit Ethernet interfaces (see Section 14.16.1 on page 367).

**Figure 47** ACL > DSCP > Setup




The following table describes the labels in this screen.

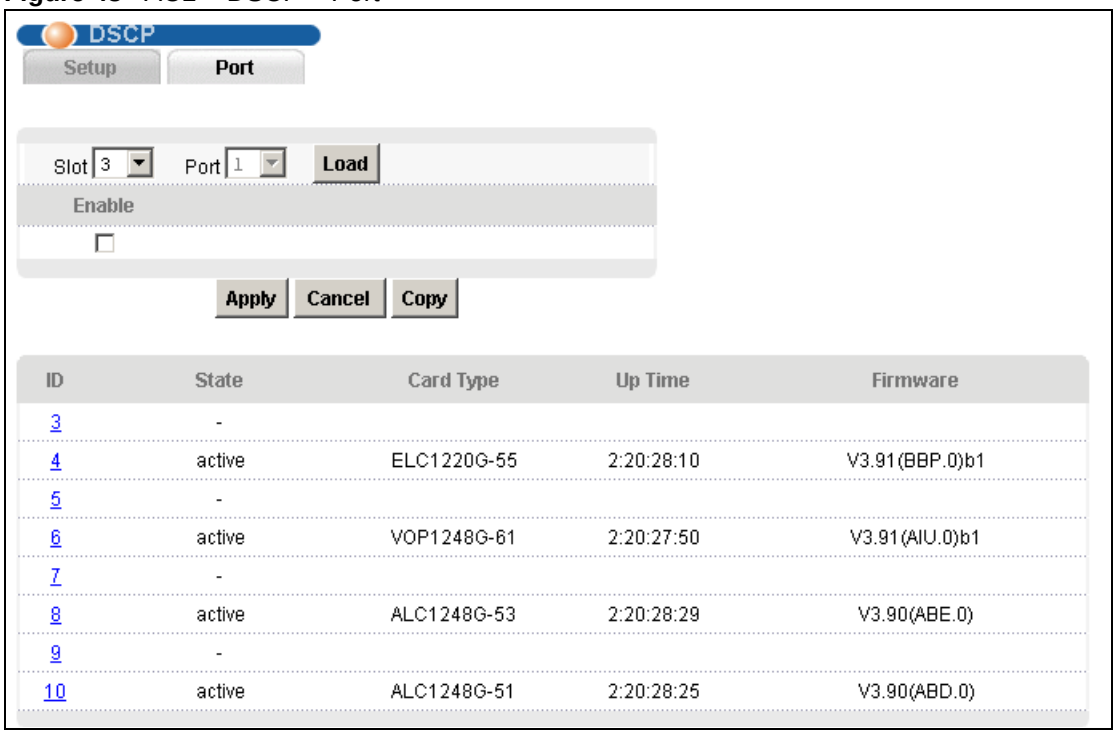
**Table 33** ACL > DSCP > Setup

| LABEL | DESCRIPTION |
|---|---|
| DSCP mapping (priority) | Use the drop-down list boxes to select an IEEE 802.1p priority to which the Device should change the DSCP service level.<br>For example, to find the IEEE 802.1p priority level for DSCP service level 43, find 40 in the left hand column and 3 in the top row. The intersection of the 3 column and 40 row shows a priority setting of 5. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

## 5.17.2 DSCP Port Screen

Click **ACL** > **DSCP** > **Port** to display the screen shown next. Use this screen to enable or disable the mapping between DSCP code points and IEEE 802.1p priorities for VLC1324G, VLC1348G, or ELC subscriber ports.

**Figure 48** ACL > DSCP > Port

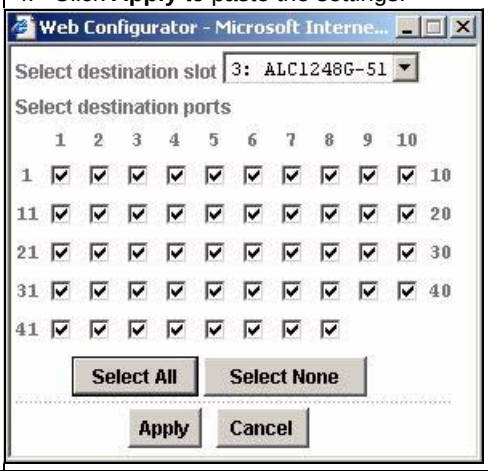



The following table describes the labels in this screen.

**Table 34** ACL > DSCP > Port

| LABEL | DESCRIPTION |
|---|---|
| Slot<br>Port | Use the drop-down list boxes to select a line card and port. |
| Load | Click **Load** to display the port's current settings. |
| Enable | Select this to have the Device map DSCP code points to IEEE 802.1p priorities for traffic the Device sends out through this port. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

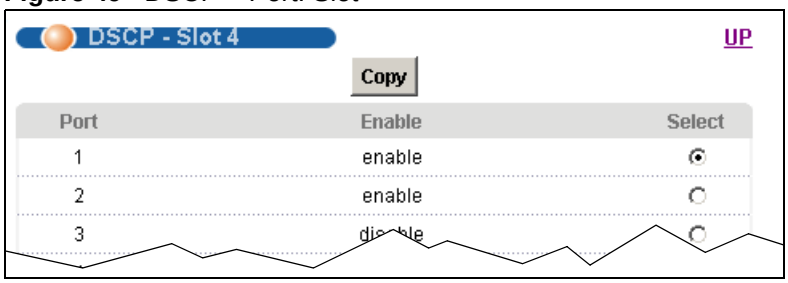
**Table 34** ACL > DSCP > Port (continued)

| LABEL | DESCRIPTION |
|---|---|
| Copy | Do the following to copy the settings you configure above to another port or ports.<br>1. Click **Copy**.<br>2. Select the line card to which you want to copy the settings.<br>3. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>4. Click **Apply** to paste the settings.<br>  |
| ID | This is the slot number of a line card. Click the index number of an active line card to display the **DSCP - Slot** screen where you can view and copy settings from one port to another port or ports on the selected line card. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 5.17.3 DSCP Port Slot Screen

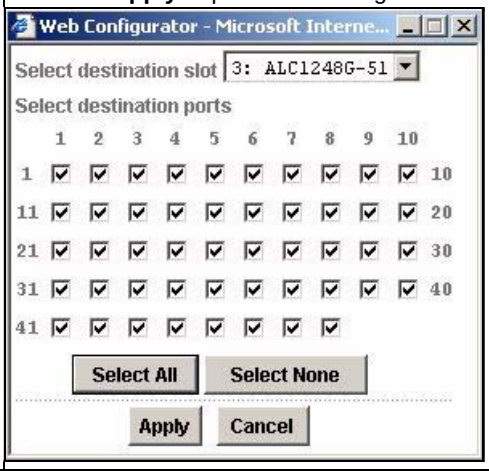
Click the slot number of an active line card in the **DSCP** > **Port** screen to display the screen shown next.

**Figure 49** DSCP > Port: Slot




The following table describes the labels in this screen.

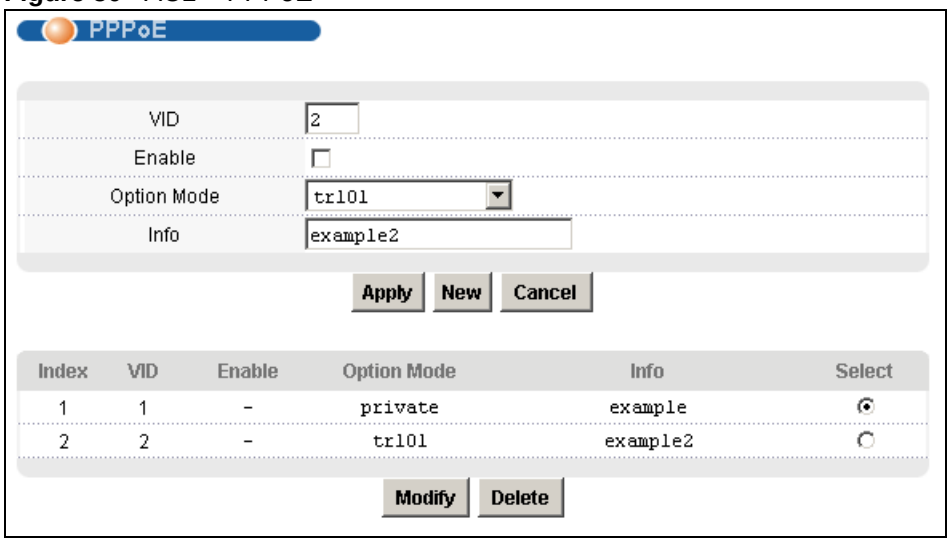
**Table 35** DSCP > Port: Slot

| LABEL | DESCRIPTION |
|---|---|
| UP | Click **UP** to go back to the previous screen. |
| Copy | Do the following to copy settings from one port to another port or ports.<br>1. Select the **Select** radio button of the port from which you want to copy settings<br>2. Click **Copy**.<br>3. Select to which line card you want to copy the settings.<br>4. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>5. Click **Apply** to paste the settings.<br>  |
| Port | This field displays the number of the DSL port. |
| Enable | This field displays whether or not mapping of DSCP code points to IEEE 802.1p priorities for traffic the Device sends out through this port is turned on.<br>the number of a VLAN to which you do not want to send broadcast traffic (through the specified port). |
| Select | Select the radio button of the port from which you want to copy settings. |

## 5.18 PPPoE Screen

Use the **ACL** > **PPPoE** screen to configure PPPoE line information setting by VLAN. The switch adds the line information to PPPoE packets for identification and security.

**Figure 50** ACL > PPPoE




The following table describes the labels in this screen.

**Table 36** ACL > PPPoE

| LABEL | DESCRIPTION |
|---|---|
| VID | Enter a VLAN ID (between 1 and 4094). |
| Enable | Turns PPPoE line information for the VLAN on or off. |
| Option Mode | Select **private** to use ZyXEL's proprietary method to encode PPPoE discover packets on the specified VLAN.<br>Select **tr101** to use TR-101 to encode PPPoE discover packets on the specified VLAN.<br>Select **tr101** to use TR-101 to encode PPPoE discover packets on the specified VLAN and include the VLAN ID.<br>See Section 5.1.1 on page 91 for more on these modes. |
| Info | Specify (up to 24 characters) of PPPoE line information. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | Click **New** to clear the fields so you can create a new entry. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |
| Index | This is the index number of an entry. |
| VID | This is the ID number of the VLAN group. |
| Enable | This field displays whether or not encoding of PPPoE line information in the VLAN's PPPoE discover packets is turned on. |
| Option Mode | This field displays the type of encoding for PPPoE line information in the VLAN's PPPoE discover packets. |
| Info | This field displays the PPPoE line information. |
| Modify | Select an entry's **Select** radio button and click **Modify** to display the entry in the table above so you can edit it. |
| Delete | Select an entry's **Select** radio button and click **Delete** to remove the entry. |

# 6

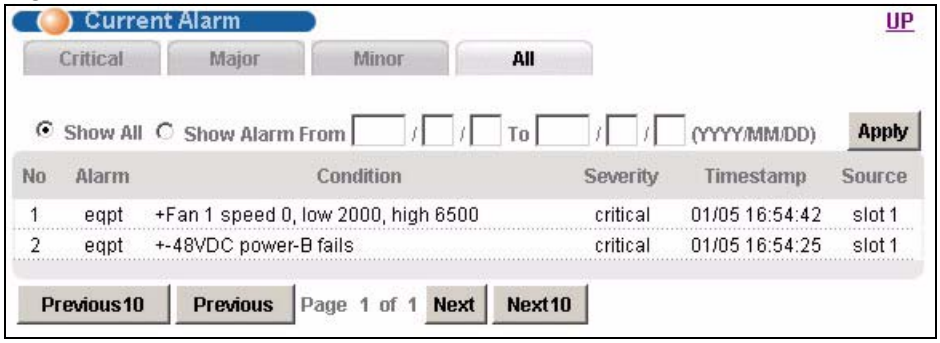
# Alarm Screens

This chapter describes alarm management.

## 6.1 Current Alarm Screen

Click **Alarm** > **Current Alarm** to display the screen where you can view all current alarms. You can also click a tab to view the alarms only specific to one severity level.

**Figure 51** Current Alarm: All




The following table describes the labels in this screen.

**Table 37** Current Alarm: All

| LABEL | DESCRIPTION |
|---|---|
| UP | Click **UP** to go to the **System Info** screen. |
| Show All | Select the radio button to display all alarms. |
| Show Alarm From To (YYYY/MM/DD) | Select the radio button and specify a range of time in the year/month/day format to display the alarms occur during this period only. |
| Apply | Click **Apply** to display the alarms (either all or from the time range you selected). |
| No | This is the index number of the alarm. |
| Alarm | This is the alarm category. |
| Condition | This is the alarm condition. |
| Severity | This is the severity level of alarms. |
| Timestamp | This is the time when the alarm occurred. |
| Source | This is the location where the alarm occurred. |
| Previous 10 | Click **Previous 10** to show the preceding 10 pages of information. |

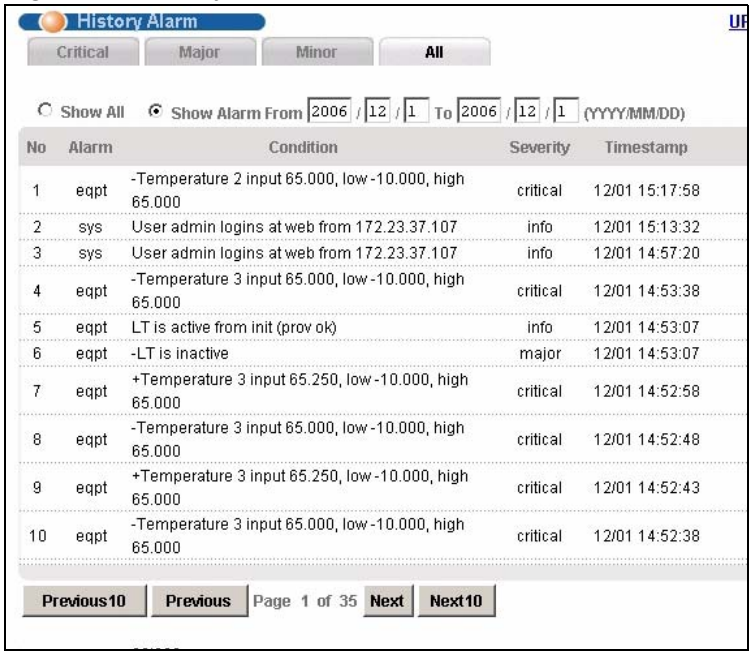
**Table 37** Current Alarm: All (continued)

| LABEL | DESCRIPTION |
|---|---|
| Previous<br>Next | Click **Previous** or **Next** to show the preceding/following screen if the information cannot be displayed in one screen. |
| Next 10 | Click **Next 10** to show the following 10 pages of alarms. |

## 6.2 History Alarm Screen

Click **Alarm > History Alarm** to display the screen where you can view all historic alarms. You can also click a tab to view the alarms only specific to one severity level.

**Figure 52** History Alarm: All


History Alarm
UP
Critical
Major
Minor
All
Show All
Show Alarm From 2006 / 12 / 1 To 2006 / 12 / 1 (YYYY/MM/DD)
No Alarm Condition Severity Timestamp
1 eqpt -Temperature 2 input 65.000, low -10.000, high 65.000 critical 12/01 15:17:58
2 sys User admin logins at web from 172.23.37.107 info 12/01 15:13:32
3 sys User admin logins at web from 172.23.37.107 info 12/01 14:57:20
4 eqpt -Temperature 3 input 65.000, low -10.000, high 65.000 critical 12/01 14:53:38
5 eqpt LT is active from init (prov ok) info 12/01 14:53:07
6 eqpt -LT is inactive major 12/01 14:53:07
7 eqpt +Temperature 3 input 65.250, low -10.000, high 65.000 critical 12/01 14:52:58
8 eqpt -Temperature 3 input 65.000, low -10.000, high 65.000 critical 12/01 14:52:48
9 eqpt +Temperature 3 input 65.250, low -10.000, high 65.000 critical 12/01 14:52:43
10 eqpt -Temperature 3 input 65.000, low -10.000, high 65.000 critical 12/01 14:52:38
Previous10
Previous
Page 1 of 35
Next
Next10

The following table describes the labels in this screen.

**Table 38** History Alarm: All

| LABEL | DESCRIPTION |
|---|---|
| UP | Click **UP** to go to the **System Info** screen. |
| Show All | Select the radio button to display all alarms. |
| Show Alarm From To (YYYY/MM/DD) | Select the radio button and specify a range of time in the year/month/day format to display the alarms occur during this period only. |
| Apply | Click **Apply** to display the alarms (either all or from the time range you selected). |
| No | This is the index number of the alarm. |
| Alarm | This is the alarm category. |
| Condition | This is the alarm condition. |
| Severity | This is the severity level of alarms. |
| TimeStamp | This is the time when the alarm occurred. |

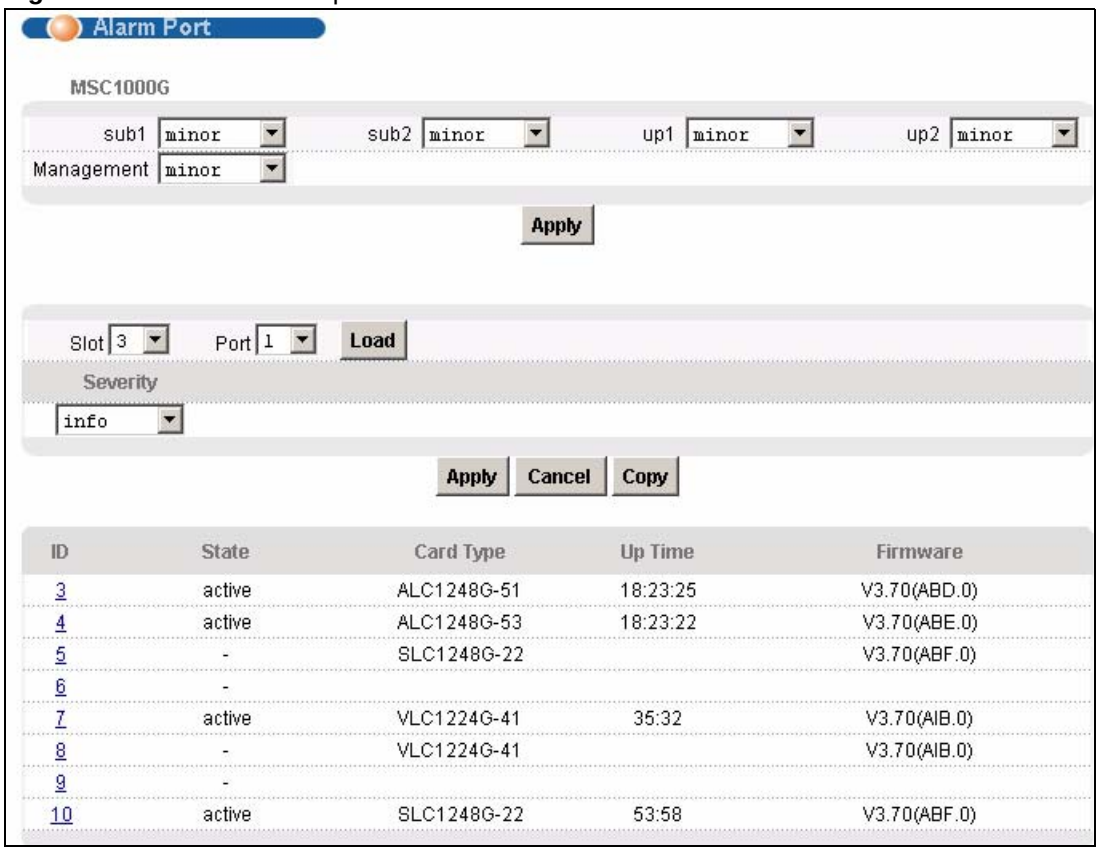
**Table 38** History Alarm: All (continued)

| LABEL | DESCRIPTION |
|---|---|
| Source | This is the location where the alarm occurred. |
| Previous 10 | Click **Previous 10** to show the preceding 10 alarms. |
| Previous<br>Next | Click **Previous** or **Next** to show the preceding/following screen if the information cannot be displayed in one screen. |
| Next 10 | Click **Next 10** to show the following 10 alarms. |

## 6.3 Alarm Port Setup Screen

Use this screen to set the severity level of alarms to record on specified ports. Click **Alarm** > **Alarm Port Setup** to display the screen shown next.

**Figure 53** Alarm Port Setup



The following table describes the labels in this screen.

**Table 39** Alarm Port Setup

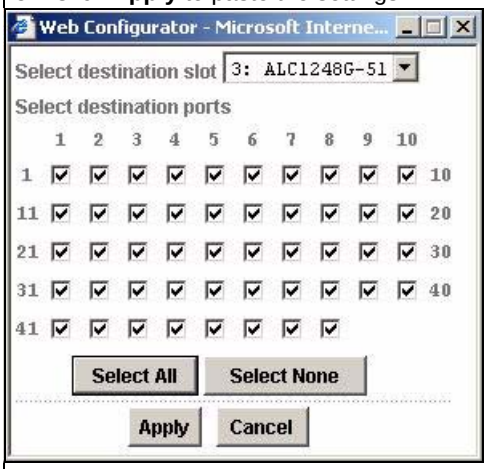
| LABEL | DESCRIPTION |
|---|---|
| sub1<br>sub2<br>up1<br>up2<br>Management | Select the severity level from **info**, **minor**, **major** and **critical** for the alarms to record on the specified port of the MSC. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Slot<br>Port | Use the drop-down list boxes to select an DSL port on a line card for which you wish to configure the severity level. |
| Load | Click **Load** to refresh the whole screen. |
| Severity | Select the minimum severity level of alarms (**info**, **minor**, **major** or **critical**) that the system records on the port. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Copy | Do the following to copy settings from one port to another port or ports.<br>1. Select the **Select** radio button of the port from which you want to copy settings<br>2. Click **Copy**.<br>3. Select to which line card you want to copy the settings.<br>4. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>5. Click **Apply** to paste the settings.<br>  |
| ID | This is the slot number of a line card. Click the index number of an active line card to display the **Alarm Port Setup Slot** screen where you can view and copy settings from one port to another port or ports on the selected line card. |

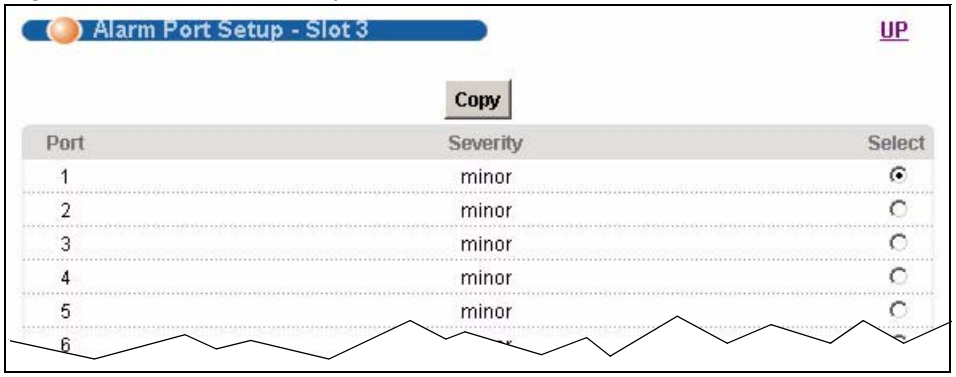
**Table 39** Alarm Port Setup (continued)

| LABEL | DESCRIPTION |
|---|---|
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 6.3.1 Alarm Port Setup Slot Screen

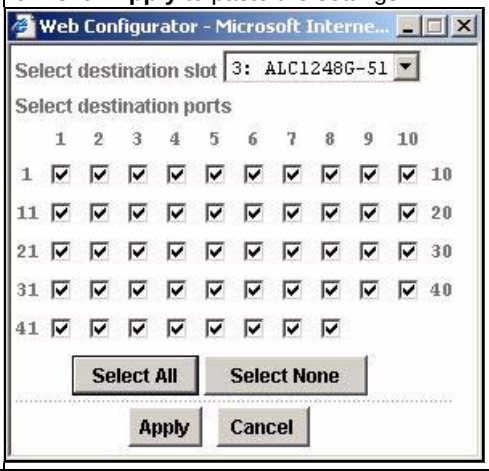
Click the slot number of a line card in the **Alarm Port Setup** screen to display the screen shown next.

**Figure 54** Alarm Port Setup: Slot



The following table describes the labels in this screen.

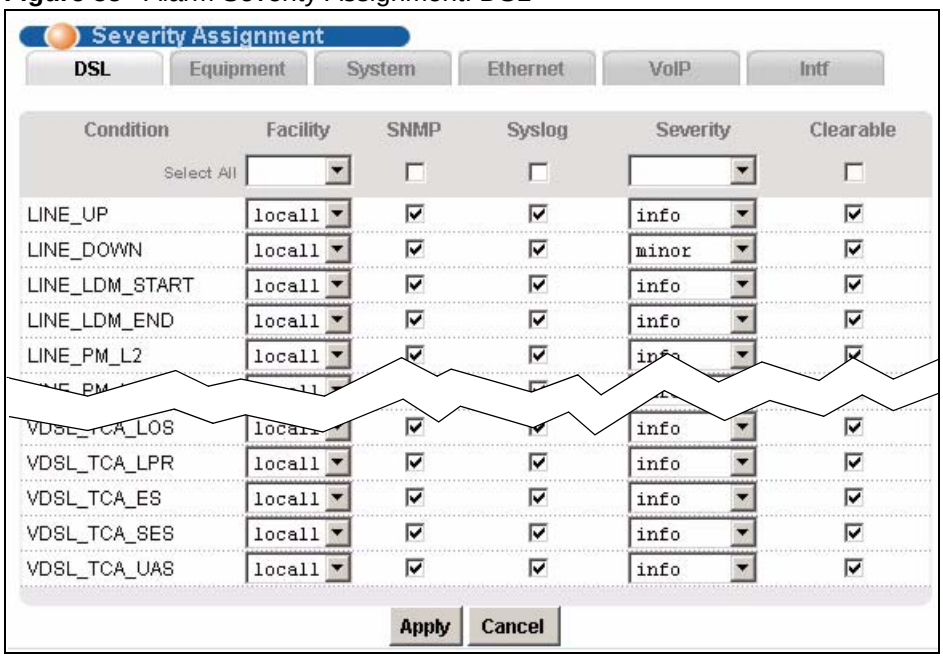
**Table 40** Alarm Port Setup: Slot

| LABEL | DESCRIPTION |
|---|---|
| UP | Click **UP** to go back to the previous screen. |
| Copy | Do the following to copy settings from one port to another port or ports.<br>1. Select the **Select** radio button of the port from which you want to copy settings<br>2. Click **Copy**.<br>3. Select to which line card you want to copy the settings.<br>4. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>5. Click **Apply** to paste the settings.<br>  |
| Port | This field displays the number of the DSL port. |
| Severity | This field displays the minimum severity level of alarms that the system records on the port. |
| Select | Select the radio button of the port from which you want to copy settings. |

## 6.4 Alarm Severity Assignment Screen

Click **Alarm** > **Alarm Severity Assignment** to configure the severity levels of individual alarms and where the system is to send them. Click a tab to view the alarms specific to an alarm category.

**Figure 55** Alarm Severity Assignment: DSL




The following table describes the labels in this screen.

**Table 41** Alarm Severity Assignment: DSL

| LABEL | DESCRIPTION |
|---|---|
| Condition | This identifies an individual alarm. See Section 6.5 on page 138 for more information. |
| Facility | Select the log facility (local1~local7) to have the device log the syslog messages to a specific file in the syslog server. See your syslog program's documentation for details. |
| SNMP | Select the check box to have the switch send SNMP traps of the specified alarm condition. |
| Syslog | Select the check box to have the switch send syslog messages of the specified alarm condition. |
| Severity | Select the severity level from **minor**, **major** and **critical** for the specified alarm condition. You cannot change the severity level of the **info** severity level alarms. |
| Clearable | Select the check box to allow an administrator to manually remove records of the specified alarm. |
| Select All | Select an option from the **Select All** drop-down list box to automatically select that option for all entries. Alternatively, you may configure individual entries.<br>Select a **Select All** check box to automatically select that option for all entries. Clear it to clear that option for all entries. Alternatively, you may select or clear the check boxes for individual entries. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

## 6.5 Alarm Descriptions

This table describes the alarms on the system. You can view the settings using the "`alarm tablelist`" CLI command.

- "ALC" is the ADSL Line Card.
- "SLC" is the SHDSL Line Card.
- "VLC" is the VDSL Line Card.
- "TCA" Stands for Threshold Crossed Alarm and indicates that an alarm profile threshold was exceeded.
- An "X" means that the alarm applies to the specific card.
- Atu-c refers to the IES-5000 or the downstream channel (for traffic going from the IES-5000 to the subscriber).
- Atu-r refers to subscriber or the upstream channel (for traffic coming from the subscriber to the IES-5000).

**Table 42** Alarm Descriptions

| ALARM | SEVERITY | MSC | ALC | SLC | VLC | VOP | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| DSL | | | | | | | |
| LINE_UP | INFO | | X | X | | | The line is up. |
| LINE_DOWN | MINOR | | X | X | | | The line is down. |
| LINE_LDM_START | INFO | | X | | | | The line entered loop diagnosis mode. |
| LINE_LDM_END | INFO | | X | | | | The loop diagnostics were OK and the line left loop diagnosis mode. |
| LINE_PM_L2 | INFO | | X | | | | The line went into power down L2 mode. |
| LINE_PM_L0 | INFO | | X | | | | The line went into power down L0 mode. |
| LINE_FAIL | MAJOR | | X | X | | | The line failed. |
| ADSL_TCA_LOL | INFO | | X | | | | The Loss Of Link seconds (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |
| ADSL_TCA_LOF | INFO | | X | | | | The Loss Of Frame seconds (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |
| ADSL_TCA_LOS | INFO | | X | | | | The Loss Of Signal seconds (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |
| ADSL_TCA_LPR | INFO | | X | | | | The Loss of Power (<value>) of 15-minute interval of the atu(c or r) reaches threshold (<value>) |
| ADSL_TCA_ES | INFO | | X | | | | The Error Seconds (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |
| ADSL_RATE_CHANGE | INFO | | X | | | | The transmission rate of the atu(c or r) changed from <value> to <value>. |

**Table 42** Alarm Descriptions (continued)

| ALARM | SEVERITY | MSC | ALC | SLC | VLC | VOP | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| ADSL_TCA_SES | INFO | | X | | | | The Severely Errored Seconds (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |
| ADSL_TCA_UAS | INFO | | X | | | | The UnAvailable Seconds (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |
| SHDSL_TCA_ATTEN | INFO | | | X | | | The loop attenuation (<value>) of the endpoint (unit address <value>-<side>-wire pair <value>) reached or exceeded the threshold (<value>). |
| SHDSL_TCA_SNRM | INFO | | | X | | | The SNR margin (<value>) of the endpoint (unit address <value>-<side>-wire pair <value>) reached or dropped below the threshold (<value>). |
| SHDSL_TCA_ES | INFO | | | X | | | The error seconds (<value>) of the endpoint (unit address <value>-<side>-wire pair <value>) reached or exceeded the threshold (<value>). |
| SHDSL_TCA_SES | INFO | | | X | | | The severely errored seconds (<value>) of the endpoint (unit address <value>-<side>-wire pair <value>) reached or exceeded the threshold (<value>). |
| SHDSL_TCA_CRC | INFO | | | X | | | The CRC anomalies (<value>) of the endpoint (unit address <value>-<side>-wire pair <value>) reached or exceeded the threshold (<value>). |
| SHDSL_TCA_LOSW | INFO | | | X | | | The Loss Of Sync Word seconds (<value>) of the endpoint (unit address <value>-<side>-wire pair <value>) reached or exceeded the threshold (<value>). |
| SHDSL_TCA_UAS | INFO | | | X | | | The UnAvailable Seconds (<value>) of the endpoint (unit address <value>-<side>-wire pair <value>) reached or exceeded the threshold (<value>) |
| VDSL_TCA_LOL | INFO | | | | X | | The Loss Of Link seconds (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |
| VDSL_TCA_LOF | INFO | | | | X | | The Loss Of Frame seconds (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |
| VDSL_TCA_LOS | INFO | | | | X | | The Loss Of Signal seconds (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |
| VDSL_TCA_LPR | INFO | | | | X | | The Loss of Power (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |

**Table 42** Alarm Descriptions (continued)

| ALARM | SEVERITY | MSC | ALC | SLC | VLC | VOP | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| VDSL_TCA_ES | INFO | | | | X | | The Error Seconds (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |
| VDSL_TCA_SES | INFO | | | | X | | The Severely Errored Seconds (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |
| VDSL_TCA_UAS | INFO | | | | X | | The UnAvailable Seconds (<value>) within 15 minutes for the atu(c or r) has reached the threshold (<value>). |
| MAC_SPOOF | Minor | | X | X | X | | A duplicated MAC address is detected in two DSL subscriber lines. |
| VDSL_RATE_CHANGE | INFO | | | | X | | The transmission rate of the vtu(o or r) changed from <value> to <value>. |
| Equipment | | | | | | | |
| DC_POWER_FAIL | CRITICAL | X | | | | | The -48VDC power -<index> failed. |
| VOLTAGE_ERROR | CRITICAL | X | X | X | | | The voltage <index> at input <value> is too low <value>, or high <value>. |
| TEMPERATURE_ERROR | CRITICAL | X | X | X | | | The temperature <index> at input <value> is too low <value> or high <value>. |
| FAN_ERROR | CRITICAL | X | | | | | The fan <index> speed <value> is too low <value> or high <value> |
| FAN_STOP_LOW_TEMP | MINOR | X | | | | | The fan stopped due to low temperature. |
| HW_MONITOR_FAIL | CRITICAL | | X | X | | | A hardware monitor diagnosis test failed. |
| COLD_START | INFO | X | | | | | System cold-start. |
| WARM_START | INFO | X | | | | | System warm-start. |
| MGMT_ETHER_UP | INFO | X | | | | | The management Ethernet interface is up. |
| MGMT_ETHER_DOWN | MINOR | X | | | | | The management Ethernet interface is down. |
| ALARM_IN | CRITICAL | X | | | | | External alarm on input <index>. |
| SPT_TOPOLOGY_CHANG | MINOR | X | | | | | A spanning tree topology change was detected. |
| NT_FW_UPLOAD_OK | INFO | X | | | | | Firmware upload was successful. |
| NT_FW_UPLOAD_FAIL | MAJOR | X | | | | | Firmware upload failed. |
| LT_PLUG_IN | INFO | X | | | | | A line card was inserted into a slot. |
| LT_PULL_OUT | MAJOR | X | | | | | A line card was removed from a slot. |
| LT_DSL_DEVICE_FAIL | CRITICAL | | X | | | | A DSL chipset on an ALC failed. |
| LT_DSL_DEVICE_RELOAD | INFO | | X | | | | A DSL chipset on an ALC re-downloaded firmware <index>. |
| LT_ACTIVE | INFO | X | | | | | A line card became active. |
| LT_INACTIVE | MAJOR | X | | | | | A line card became inactive. |

**Table 42** Alarm Descriptions (continued)

| ALARM | SEVERITY | MSC | ALC | SLC | VLC | VOP | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| LT_FW_UPLOAD_OK | INFO | X | X | X | | | Firmware was successfully uploaded to a card. |
| LT_FW_UPLOAD_FAIL | MAJOR | X | X | X | | | Firmware upload to a card failed. |
| LT_ENABLE | INFO | X | | | | | Line card enabled. |
| LT_DISABLE | INFO | X | | | | | Line card disabled. |
| LT_RESET | INFO | X | | | | | Line card reset. |
| NT_SWITCH_OVER | MAJOR | X | | | | | The MSC1000G in standby mode becomes active. |
| CPU_UTIL_HIGH | MAJOR | X | | | | | The MSC1000G is overloading. |
| VOP_BATTERY_FAIL | CRITICAL | | | | | X | A VOP card's battery failed. |
| VOP_CLOCK_FAIL | CRITICAL | | | | | X | A VOP card's clock failed. |
| ER_FAULT | CRITICAL | | | | | X | A VOP card's ringer failed. |
| PKTBUFF_LOW | MAJOR | | | | | | The buffer storage for packet transmission is too low. This might cause some incoming packets to be dropped. |
| MEMORY_USAGE_HIGH | MAJOR | | | | | | The memory usage is too high. |
| STP_NEW_ROOT | MINOR | | | | | | Spanning Tree Protocol detects a new root bridge. |
| System | | | | | | | |
| REBOOT | INFO | X | | | | | The system restarted. |
| CONFIG_CHANGE | INFO | X | | | | | The system configuration has changed. |
| CONFIG_UPLOAD_OK | INFO | X | | | | | Uploading of the system configuration was successful. |
| CONFIG_UPLOAD_FAIL | MAJOR | X | | | | | Uploading of the system configuration failed. |
| TIME_SYNC_FAIL | MINOR | X | | | | | Synchronizing the time with a timeserver failed. |
| ALARM_CUT_OFF | INFO | X | | | | | An administrator cutoff (canceled) an alarm. |
| ALARM_CLEAR | INFO | X | | | | | An administrator cleared the alarms. |
| LOGIN_FAIL | MINOR | X | | | | | A user failed to login. |
| LOGIN_OK | INFO | X | | | | | A user logged in successfully. |
| ACCOUNT_ADD | INFO | X | | | | | A user account was added. |
| ACCOUNT_DELETE | INFO | X | | | | | A user account was deleted. |
| ACCOUNT_MODIFY | INFO | X | | | | | A user's account was modified. |
| SVR_SYNC_PROF_OK | INFO | X | | | | | Server-initiated profile synchronization is successful. |
| SVR_SYNC_PROF_FAIL | INFO | X | | | | | Server-initiated profile synchronization failed. |
| CLI_SYNC_PROF_OK | INFO | X | | | | | Client-initiated profile synchronization is successful. |

**Table 42** Alarm Descriptions (continued)

| ALARM | SEVERITY | MSC | ALC | SLC | VLC | VOP | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| CLI_SYNC_PROF_FAIL | INFO | X | | | | | Client-initiated profile synchronization failed. |
| ANTI_SPOOFING | Minor | X | | | | | A system connected to the MSC1000G detected a MAC address connected to more than one port. |
| CLUSTER_MBR_ACTIVE | INFO | X | | | | | The cluster manager has established a connection with a particular cluster member. |
| CLUSTER_MBR_INACTIVE | INFO | X | | | | | The cluster manager has established a connection with a particular cluster member. |
| CLUSTER_MBR_ADD | INFO | X | | | | | The cluster manager added a member to a cluster. |
| CLUSTER_MBR_DELETE | INFO | X | | | | | The cluster manager removed a member from cluster. |
| PING_PROBE_FAIL | INFO | X | | | | | A continuous ping test via diagnostic tool is failed. |
| PING_TEST_FAIL | INFO | X | | | | | A ping test via diagnostic tool is failed. |
| PING_TEST_COMPLETE | INFO | X | | | | | A ping test via diagnostic tool is completed. |
| TRACERT_TEST_FAIL | INFO | X | | | | | A trace route test via diagnostic tool is failed. |
| TRACERT_TEST_COMPLETE | INFO | X | | | | | A trace route test via diagnostic tool is completed. |
| Ethernet | | | | | | | |
| ENET_UP | INFO | X | | | | | One of the MSC1000G's Gigabit Ethernet interfaces is up. |
| ENET_DOWN | MINOR | X | | | | | One of the MSC1000G's Gigabit Ethernet interfaces is down. |
| VOP | | | | | | | |
| VOP_TEMP_ERROR | CRITICAL | | | | | X | A SLAC thermal fault has been detected on a VOP card's. |
| VOP_DC_POWER_FAIL | CRITICAL | | | | | X | A SLAC DC fault has been detected on a VOP card's telephone line. |
| VOP_AC_POWER_FAIL | CRITICAL | | | | | X | A SLAC AC fault has been detected on a VOP card's telephone line. |
| VOP_RING_TIMER_FAIL | CRITICAL | | | | | X | A VOP card's ring timer failed. |
| VOP_RING_RSRCE_FAIL | CRITICAL | | | | | X | Too many ports are ringing, so there was not enough ring power to ring the phone connected to this port. |
| VOP_RING_OHD_FAIL | CRITICAL | | | | | X | A ring overload indication has been detected. A VOP card is close to using its full ring power and will reduce the ring output power if the load continues to increase. |

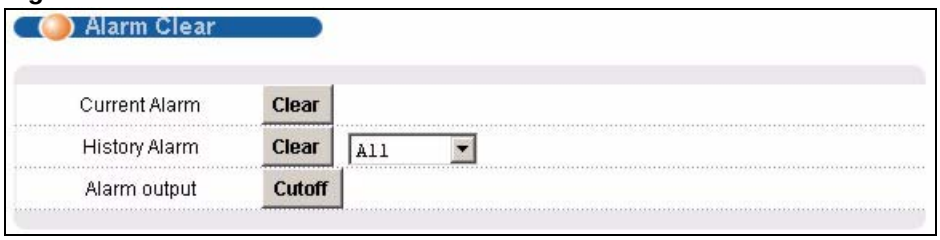
**Table 42** Alarm Descriptions (continued)

| ALARM | SEVERITY | MSC | ALC | SLC | VLC | VOP | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| Interface | | | | | | | |
| CFM_ERROR | INFO | X | | | | | A connectivity fault is detected by CFM loopback or linktrace test. |

## 6.6 Alarm Clear Screen

Click **Alarm** > **Alarm Clear** to open this screen where you can erase alarm entries.

**Figure 56** Alarm Clear




The following table describes the labels in this screen.

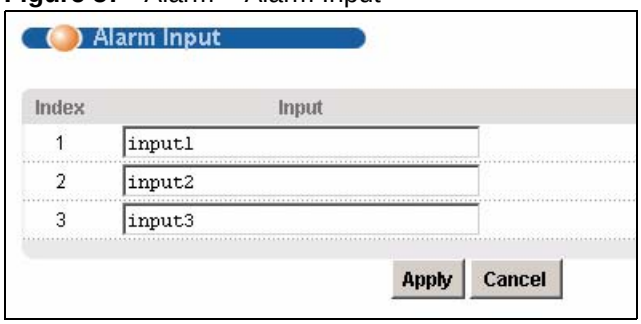
**Table 43** Alarm Clear

| LABEL | DESCRIPTION |
|---|---|
| Current Alarm | Click **Clear** to manually remove the records of all the current alarms that are clearable. |
| History Alarm | Click **Clear** to manually remove the records of all the historical (past) alarms that are clearable. Use the drop-down list box to select the severity level of alarms that you want to remove. |
| Alarm output Cutoff | Click **Cutoff** to cancel an alarm. This stops the sending of the alarm signal current. This is useful in stopping an alarm if you have the alarm output connector pins connected to a visible or audible alarm. The alarm entry remains in the system. |

## 6.7 Alarm Input Screen

Click **Alarm** > **Alarm Input** to open the following screen. Use this screen to configure names for the external alarm inputs so it is easier to identify the cause of an alarm.

**Figure 57** Alarm > Alarm Input



The following table describes the labels in this screen.

**Table 44** Alarm > Alarm Input

| LABEL | DESCRIPTION |
|---|---|
| Index | This is the index number for the external alarm input. |
| Input | Enter 1 to 31 characters for the name of the connected external alarm system. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

# 7

# Cluster Screens

This chapter covers how to configure cluster management.

## 7.1 Cluster Management Status Overview

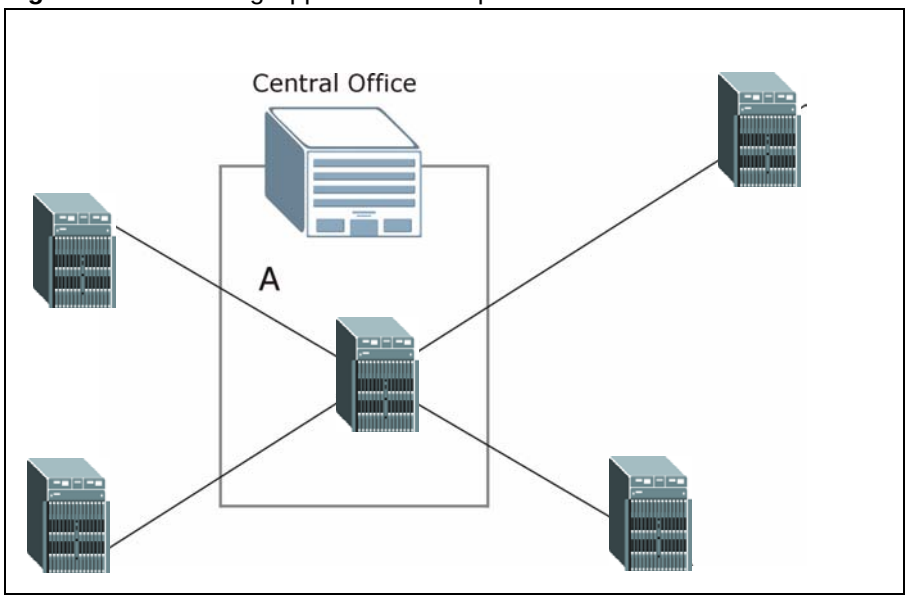
Cluster management allows you to manage multiple DSLAMs through one DSLAM, called the cluster manager. The DSLAMs must be directly connected and be in the same VLAN group so as to be able to communicate with one another.

**Table 45** ZyXEL Cluster Management Specifications

| | |
|---|---|
| Maximum number of cluster members | 8 |
| Cluster Member Models | Must be DSLAMs compatible with ZyXEL cluster management implementation. |
| Cluster Manager | The DSLAM through which you can access the web configurators of the cluster member DSLAMs. |
| Cluster Members | The DSLAMs (up to seven) being accessed through the cluster manager DSLAM. |

In the following example, DSLAM **A** in the central office is the cluster manager and the other DSLAMs are cluster members.

**Figure 58** Clustering Application Example

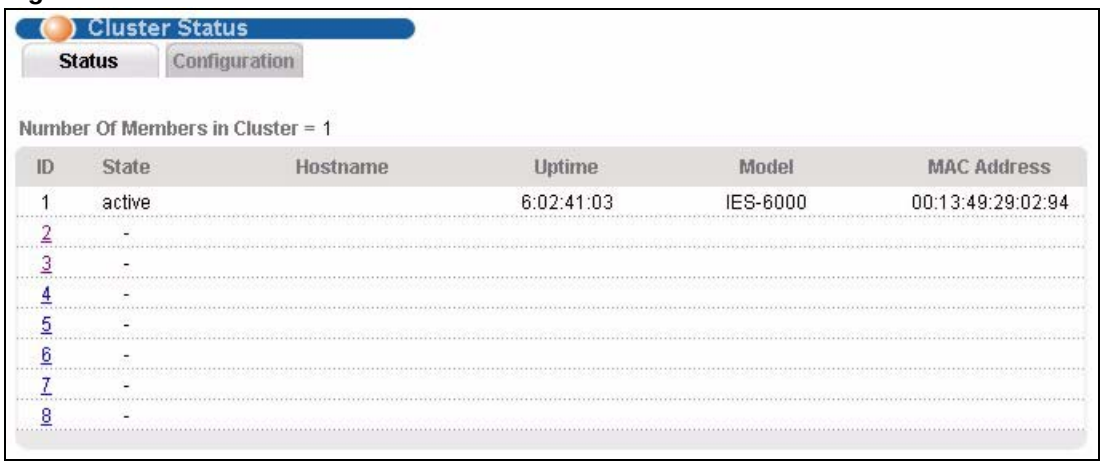


## 7.2 Cluster Management Status

Click **Cluster** in the navigation panel to display the following screen.

A cluster can only have one manager.

**Figure 59** Cluster: Status




The following table describes the labels in this screen.

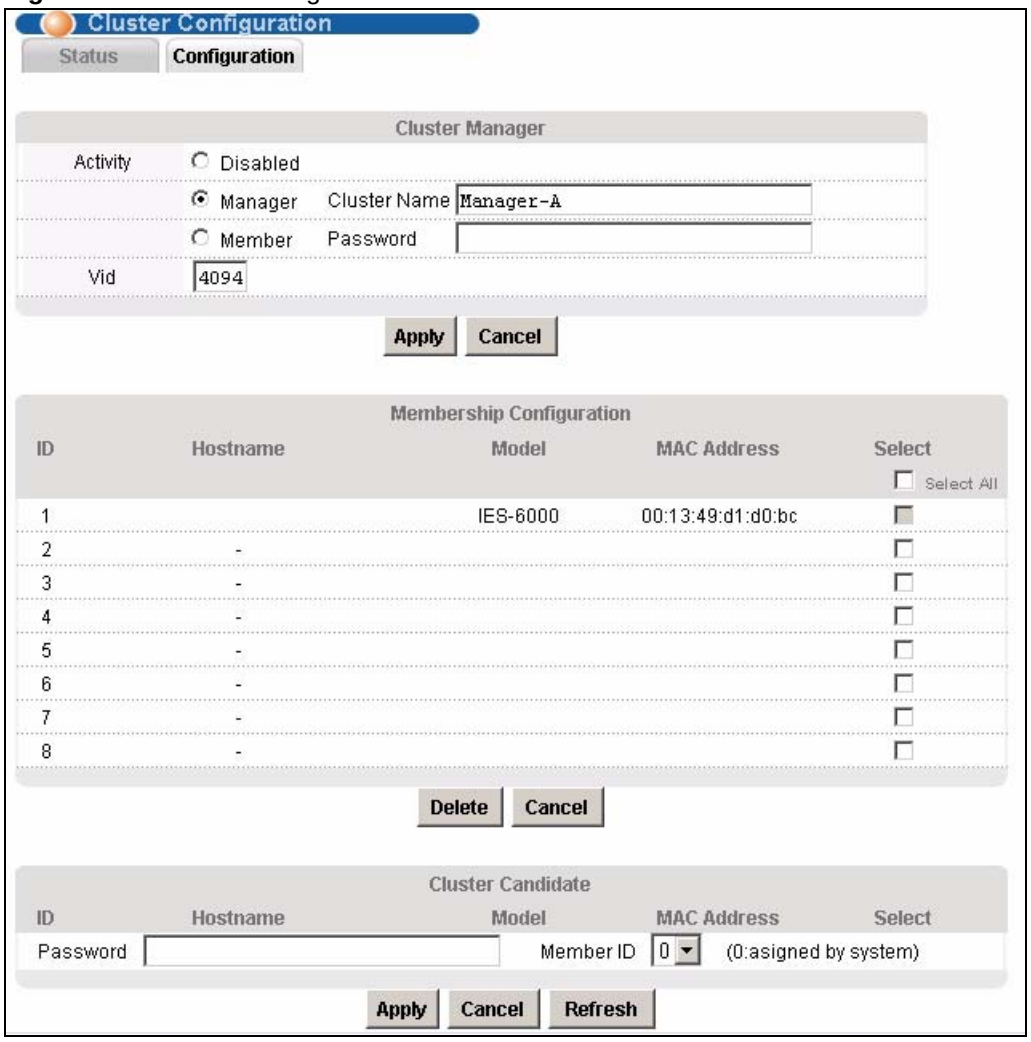
**Table 46** Cluster: Status

| LABEL | DESCRIPTION |
|---|---|
| Number of Members in Cluster | This is how many DSLAMs are in the management cluster (including the cluster manager). |
| ID | You can manage cluster member DSLAMs via the cluster manager DSLAM. The number for each cluster member is a hyperlink leading to the DSLAM's web configurator (see Figure 61 on page 149). ID 1 is the cluster manager. |
| State | This field displays the status of this DSLAM within the cluster.<br>**active**: the manager can communicate with the member.<br>**inactive**: the manager can not communicate with the member.<br>**waiting**: the manager has sent a command to add the member and is waiting for a response.<br>**error**: the member reported that the password was wrong.<br>If a member DSLAM's management password changes, then it cannot be managed from the cluster manager and its **State** displays as **error.** You need to delete the member from the **Cluster > Configuration** screen's **Membership Configuration** list and re-add it from the **Cluster Candidate** list. |
| Hostname | This is the cluster DSLAM's **System Name**. |
| Uptime | This field displays how long the DSLAM has been turned on and in the cluster. |
| Model | This field displays the model name of the DSLAM. |
| MacAddr | This is the DSLAM's hardware MAC address. |

# 7.3 Cluster Management Configuration

Use this screen to configure cluster management settings. Click **Cluster** > **Configuration** to display the next screen.

**Figure 60** Cluster: Configuration



The following table describes the labels in this screen.

**Table 47** Cluster: Configuration

| LABEL | DESCRIPTION |
|---|---|
| Cluster Manager | |
| Activity | Select **Disabled** to have this DSLAM not function as part of the cluster.<br>Select **Manager** to have this DSLAM become the cluster manager DSLAM. A cluster can only have one manager. Other cluster managers do not display in the **Cluster Candidate** list.<br>Select **Member** to have this DSLAM become a cluster member so it can be managed through the cluster manager.<br>If a DSLAM that was previously a cluster member is later set to become a cluster manager, then its **Status** is displayed as **Error** in the old cluster manager's **Cluster > Status** screen and a warning icon ( ⚠ ) appears in the **Cluster > Configuration** screen's **Membership Configuration** list. You need to change the cluster configuration of the old cluster member. |
| Cluster Name | Type a name to identify the cluster. You may use up to 32 printable characters. Spaces are not allowed. |
| Password | Each cluster member's password is its management password. When you set a DSLAM to be a cluster member, enter its management password. |
| Vid | This is the cluster management VLAN ID. The cluster's DSLAMs must be directly connected and in the same VLAN group. The cluster management VID must be different from the management VID. |
| Apply | Click **Apply** to save the changes in this section of the screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Membership Configuration | The following table lists the DSLAMs that the cluster manager has added to the cluster. |
| ID | This is the index number of a cluster member. |
| Hostname | This is the cluster DSLAM's **System Name**. |
| Model | This field displays the device's model name. |
| MAC Address | This is the DSLAM's hardware MAC address. |
| Select | Select this check box (or use **Select All** to select every check box) and then click the **Delete** button to remove a cluster member from the cluster. |
| Cancel | Click **Cancel** to reset the fields. |
| Cluster Candidate | The MSC1000G finds potential cluster member DSLAMs by auto-discovery and lists them here. The DSLAMs must be directly connected and in the same VLAN group. You must have also logged into that device and configured it as a cluster member.<br>A device can only be part of one cluster at a time. If a device is already in another cluster, it does not display here. Devices that are set to be cluster managers will not be visible. |
| ID | This is the index number of a cluster member candidate. |
| Hostname | This is the cluster DSLAM's **System Name**. |
| Model | This field displays the device's model name. |
| MAC Address | This is the DSLAM's hardware MAC address. |

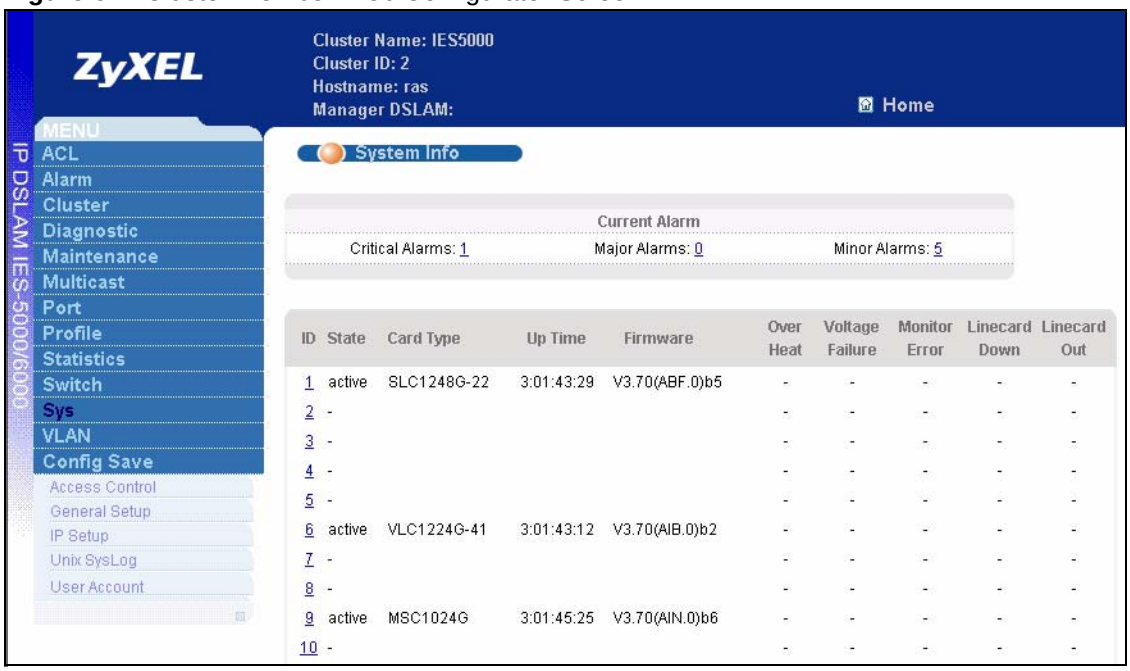
**Table 47** Cluster: Configuration (continued)

| LABEL | DESCRIPTION |
|---|---|
| Select | Select this check box and then configure the **Password** and the **Member ID** fields and click the **Apply** button to add a cluster member candidate to the cluster. |
| Password | Each cluster member's password is its management password. When you select a DSLAM to be a cluster member, enter its management password.<br>If a member DSLAM's management password changes, then it cannot be managed from the cluster manager. Its **State** displays as **Error** in the **Cluster > Status** screen and a warning icon ( ⚠ ) appears in the **Cluster > Configuration** screen's **Membership Configuration** list. You need to delete the member from the **Membership Configuration** list and re-add it from the **Cluster Candidate** list. |
| Member ID | This is the index number of a cluster member. |
| Apply | Click **Apply** to add a cluster member candidate to the cluster. The MSC1000G checks the password with the device. The changes in this section of the screen are saved to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to reset the fields. |
| Refresh | Click **Refresh** to update the list of suitable candidates found by auto-discovery. |

## 7.3.1 Cluster Member Management

Click **Cluster** > **Status** screen of the cluster manager and then click an **Index** hyperlink from the list of members to go to that cluster member's web configurator. The top of the cluster member's web configurator screen displays cluster information.

**Figure 61** Cluster Member Web Configurator Screen



The following table describes the labels at the top of the screen.

**Table 48** Cluster Member Web Configurator Screen

| LABEL | DESCRIPTION |
|---|---|
| Cluster Name | This is the name of the cluster. |
| Cluster ID | This is the VLAN ID that the cluster uses and is only applicable if the manager DSLAM is set to use IEEE 802.1Q VLAN. All DSLAMs must be directly connected and in the same VLAN group to belong to the same cluster. This field is ignored if the clustering manager is using port-based VLAN. |
| Hostname | This is the cluster member DSLAM's **System Name**. |
| Manager DSLAM | This is the cluster manager DSLAM's **System Name**. |

# 8

# Diagnostic Screens

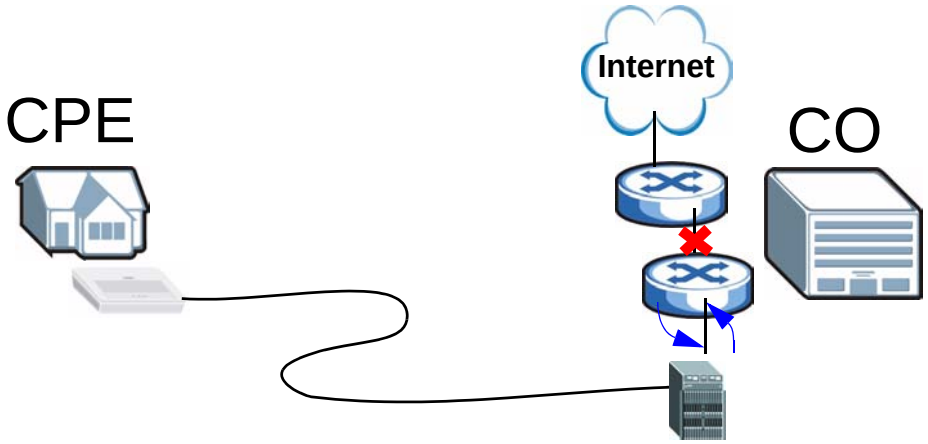
This chapter explains the **Diagnostic** screens.

## 8.1 CFM Overview

The route between a CO network and one of a CPE user may go through aggregated switches, routers and/or DSLAMs owned by independent organizations. A connectivity fault point generally takes time to discover and impacts on subscribers' network access. In order to reduce management and maintenance requirements, the IEEE 802.1ag Connectivity Fault Management (CFM) specification was developed to allow network administrators to identify and manage connection faults. Through discovery and verification of packet paths, CFM can detect and analyze connectivity faults in bridged LANs.

The figure shown below is an example of a connection fault between switches on the LAN. CFM can be used to identify and manage this kind of connection problem.

**Figure 62** Management for any Fault in Bridges




### 8.1.1 How CFM Works

To enable CFM, a pro-active Connectivity Check (CC) between two CFM-aware devices in the same MD (Maintenance Domain) network takes place. An MA (Maintenance Association) defines a VLAN and associated ports on the device under an MD level. In this MA, a port can be an MEP (Maintenance End Point) port or an MIP (Maintenance Intermediate Point) port.

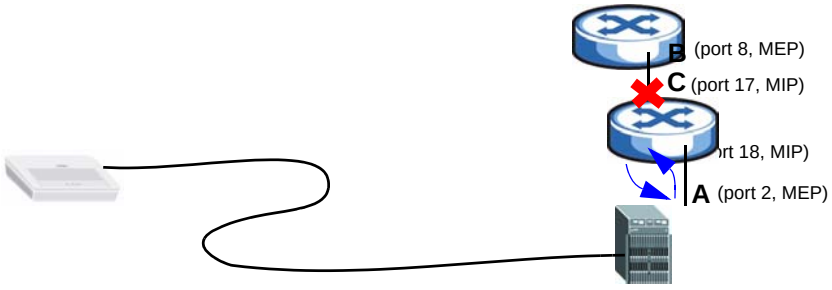
- MEP port - has the ability to send pro-active connectivity check (CC) packets and get other MEP ports information from the CC packets of neighboring switches within an MA.
- MIP port - only forwards the CC packets.

CFM provides two tests to discover connectivity faults.

- Loopback test - similar to “pinging” a computer. A loopback test checks if the MEP port receives its LBR (Loop Back Response) from its target after it sends the LBM (Loop Back Message). If no response is received, there might be a connectivity fault between them.
- Link trace test - similar to the “traceroute” function. A link trace test provides additional connectivity fault analysis to obtain more information on where the fault is. In the link trace test, MIP ports also send a LTR (Link Trace Response) in response to the source MEP port’s LTM (Link Trace Message). If an MIP or MEP port does not respond to the source MEP, this may indicate a fault. Administrators can take further action to check and resume services from the fault according to the line connectivity status report.

An example is shown next. A user reports he cannot access the Internet. To check the problem, the administrator starts the link trace test from the **A** which is an MEP port to the **B** which is also an MEP port. Each aggregation MIP port between aggregated devices response the LTM packets and also forwards them to the next port. A fault occurs in the port **C**. **A** discovers the fault since it just gets the LTR packets from the ports flowing before the port **C**.

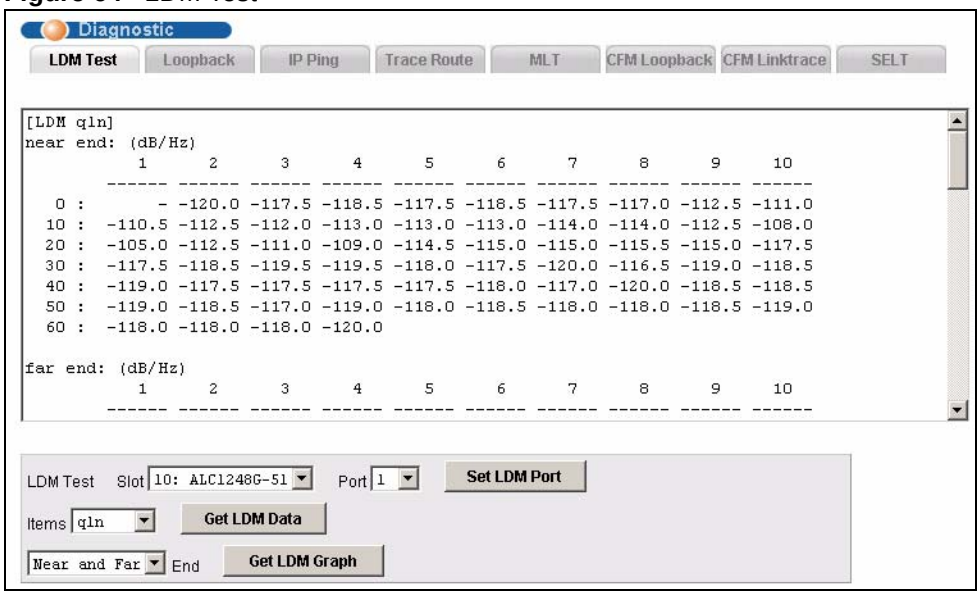
**Figure 63** MIP and MEP Example




## 8.2 LDM Test Screen (DELT)

Click **Diagnostic** > **LDM** in the navigation panel to display this screen. Use this screen to perform loop diagnostics (LDM stands for Loop Diagnostic Mode) on an ADSL2, ADSL2+ or VDSL port. This is a Dual End Loop Test (DELT) that acts on a per-tone basis. A DELT provides details about the line condition. The subscriber device must also support DELT in order to perform this. See ITU-T G933.2 for more information. This feature is applicable for ALC line cards only.

**Figure 64** LDM Test




The following table describes the labels in this screen.

**Table 49** LDM Test

| LABEL | DESCRIPTION |
|---|---|
| LDM Test | Select slot and port numbers from the **Slot** and **Port** drop-down list boxes and click **Set LDM Port** to perform loop diagnostics on the specified port. Only slots with an active ADSL line card display in the **Slot** drop-down list box. The ADSL port must be set to ADSL2 or ADSL2+ ADSL operational mode and have a connection. It takes about one minute for the loop diagnostics to finish.<br><br>Note: Wait at least one minute after using **Set LDM Port** before using **Get LDM Data**. |
| Items | After you use **Set LDM Port**, select a type of test results to display<br>**result**: Displays the basic loop diagnostic mode test results.<br>**hlin**: Displays the channel characteristics function represented in linear format by a scale factor and a complex number. These are the maximum upstream and downstream scale factors used in producing the channel characteristics function.<br>**hlog**: Displays channel characteristics. The format provides magnitude values in a logarithmic scale. This can be used in analyzing the physical condition of the ADSL or VDSL line.<br>**qln**: Displays the Quiet Line Noise for a DMT tone is the rms (root mean square) level of the noise present on the line, when no ADSL or VDSL signals are present. It is measured in dBm/Hz. The QLN can be used in analyzing crosstalk.<br>**snr**: Displays the upstream and downstream Signal to Noise Ratio (in dB). A DMT tone's SNR is the ratio between the received signal power and the received noise power. The SNR can be used in analyzing time dependent changes in crosstalk levels and line attenuation (such as those caused by temperature variations and moisture).<br>Then click **Get LDM Data** to display the loop diagnostics results. Use the loop diagnostics results to analyze problems with the physical ADSL line. |
| End | Select **Near** to display results for the upstream traffic (coming from the subscriber to the line card).<br>Select **Far** to display results for the downstream traffic (going from the line card to the subscriber). |
| Get LDM Graph | Click this to display the loop diagnostics results as a line graph. |

### 8.2.1 Loop Diagnostics Test Parameters

The following table lists the loop diagnostics test parameters that display, see the ITU-T's G.992.3 for more information.

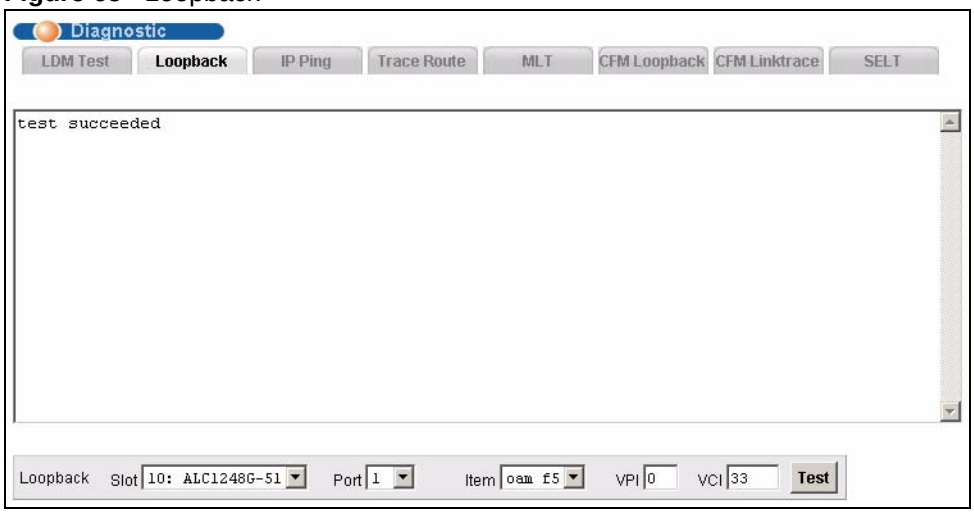
**Table 50** Loop Diagnostics Test Parameters

| LABEL | DESCRIPTION |
|---|---|
| near end | This column of diagnostics results is for the upstream traffic (coming from the subscriber to the IES-5000). |
| far end | This column of diagnostics results is for the downstream traffic (going from the IES-5000 to the subscriber). |
| attainable bit rate (kbps) | This is the upstream and downstream attainable net data rate in Kilobits/s. |
| loop attenuation (dB) | This is the upstream and downstream line attenuation, measured in decibels (dB).<br>Loop attenuation is the difference between the power transmitted at the near-end and the power received at the far-end. Loop attenuation is affected by the channel characteristics (wire gauge, quality, condition and length of the physical line). |
| signal attenuation (dB) | This is the upstream and downstream signal attenuation (reductions in amplitude of the DSL signal). It is measured in decibels (dB).<br>Signal attenuation is affected by factors such as noise, heat, crosstalk and loop attenuation. |
| snr margin (dB) | This is the upstream and downstream Signal-to-Noise Ratio margin (in dB). A DMT sub-carrier's SNR is the ratio between the received signal power and the received noise power. The signal-to-noise ratio margin is the maximum that the received noise power could increase with the system still being able to meet its transmission targets. |
| actual tx power fe (dBm) | This is the upstream and downstream far end actual aggregate transmit power (in dBm) |

## 8.3 Loopback Screen

Click **Diagnostic > Loopback** in the navigation panel to display this screen. Use this screen to perform loopback tests.

**Figure 65** Loopback




The following table describes the labels in this screen.

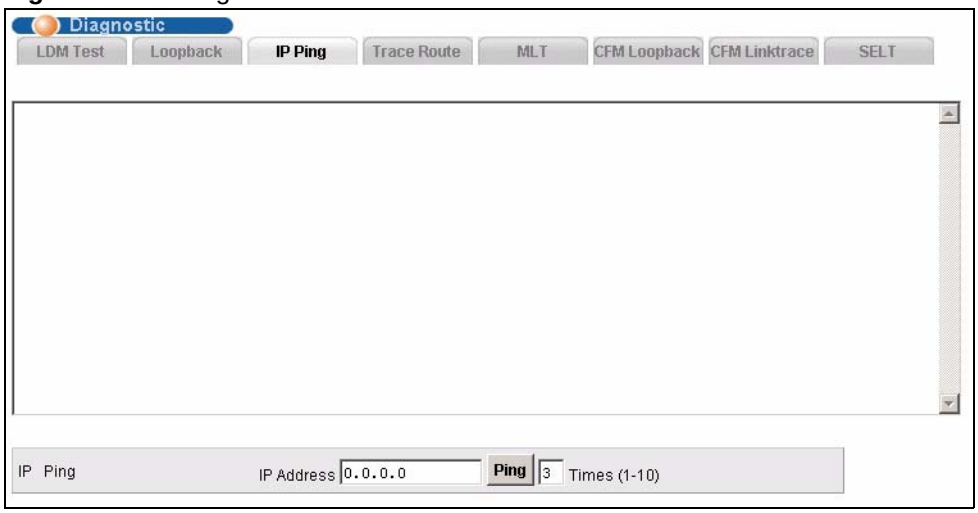
**Table 51** Loopback

| LABEL | DESCRIPTION |
|---|---|
| Loopback | Select slot and port numbers from the **Slot** and **Port** drop-down list boxes.<br>In the **Item** drop-down list box, select the type of loopback test. Currently oam f5 loopback test is supported. An Operational, Administration and Maintenance Function 5 test is used to test the connection between two DSL devices. First, the DSL devices establish a virtual circuit. Then the local device sends an ATM F5 cell to be returned by the remote DSL device (both DSL devices must support ATM F5 in order to use this test). The results ("Passed" or "Failed") display in the multi-line text box.<br>Enter a VPI/VCI to specify a PVC. Click **Test** to perform the loopback test. |

## 8.4 IP Ping Screen

Click **Diagnostic** > **IP Ping** in the navigation panel to display this screen. Use this screen to ping IP addresses.

**Figure 66** IP Ping



The following table describes the labels in this screen.

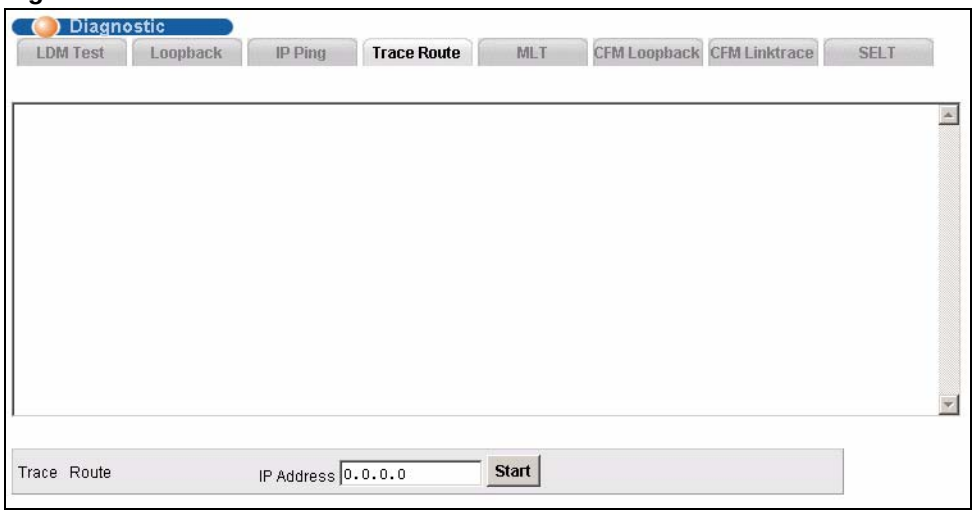
**Table 52** IP Ping

| LABEL | DESCRIPTION |
|---|---|
| IP Ping | Type the IP address of a device that you want to ping in order to test a connection.<br>In the field to the right specify the number of times that you want to ping the IP address.<br>Click **Ping** to ping the IP address that you specified. |

## 8.5 Trace Route Screen

Click **Diagnostic** > **IP Trace Route** in the navigation panel to display this screen. Use this screen to show the path that packets take from the system to a specific IP address.

**Figure 67** Trace Route




The following table describes the labels in this screen.

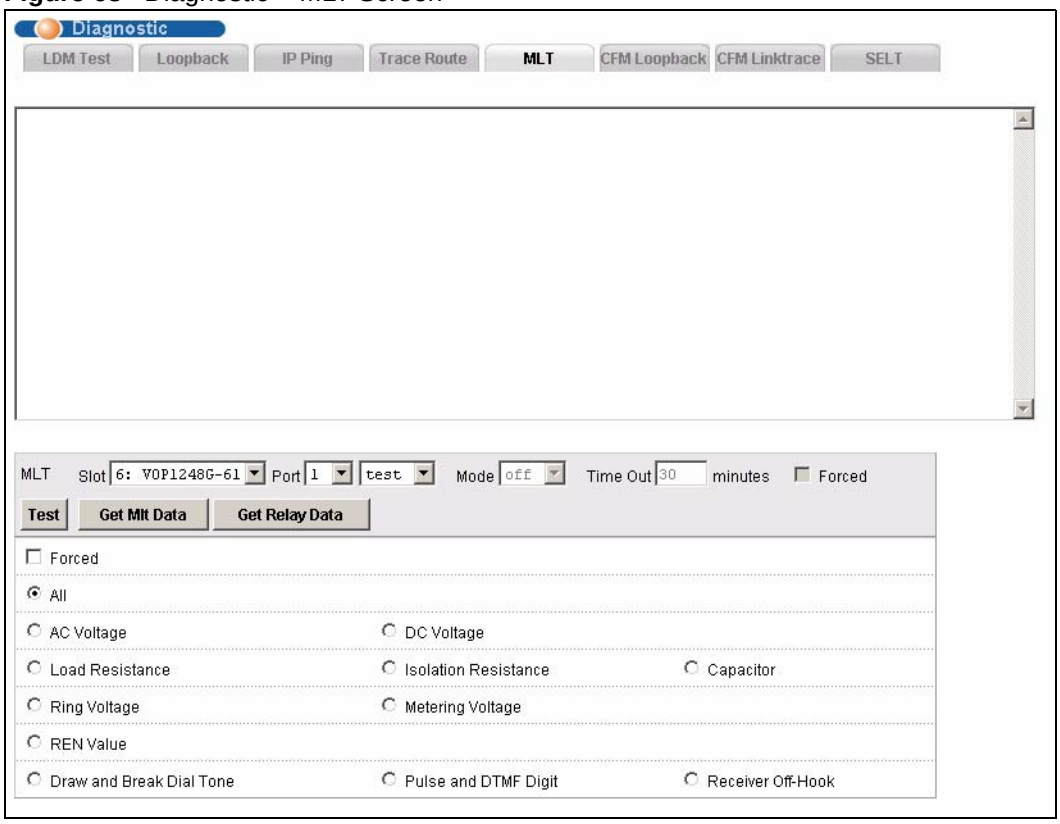
**Table 53** Trace Route

| LABEL | DESCRIPTION |
|---|---|
| Trace Route | Type the IP address of a device.<br>Click **Start** to perform a trace route in order to check the path that packets take to get to the IP address that you specified. |

## 8.6 The MLT Screen

Use this screen to perform a variety of standard Metallic Line Tests on the lines connected to VOP ports. You can also allow or prohibit line tests using diagnostic equipment connected via the VOP's **Test In** and **Test Out** ports. Click **Diagnostic** > **MLT**. The following screen displays.

**Figure 68** Diagnostic > MLT Screen




The following table describes the labels in this screen.

**Table 54** Diagnostic > MLT Screen

| LABEL | DESCRIPTION |
|---|---|
| MLT | Use the **Slot** and **Port** drop-down list boxes to select the port on an active VoIP line card you want to configure.<br>Select **Test** to perform line tests directly from the MSC1000G.<br>Select **Relay** to allow or prohibit line testing performed by external devices connected to the VOP line cards **Test In** and T**est Out** ports.<br>When you select **Relay**, also select the MLT relay mode:<br>**In**: allow diagnostic inner loop tests to be initiated by an external device.<br>**Out**: allow diagnostic outer loop tests to be initiated by an external device.<br>**Off**: forbid MLT relay testing.<br>**Both**: allow both inner and outer loop diagnostic tests to be initiated by an external device. |
| Forced | In **Relay** mode, select this to make the configuration change immediately, even if the port is currently in use. |
| Test | In **Test** mode, click this to perform the specified test. |
| Set | In Relay mode, click this to save the current settings (you must also click the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring). |
| Get MLT Data | Click this to see the results of the latest MLT test performed on the specified line card and port. |
| Get Relay Data | Click this to see the current MLT relay configuration of the specified line card. |
| The following MLT options are available only in **Test** mode. | |

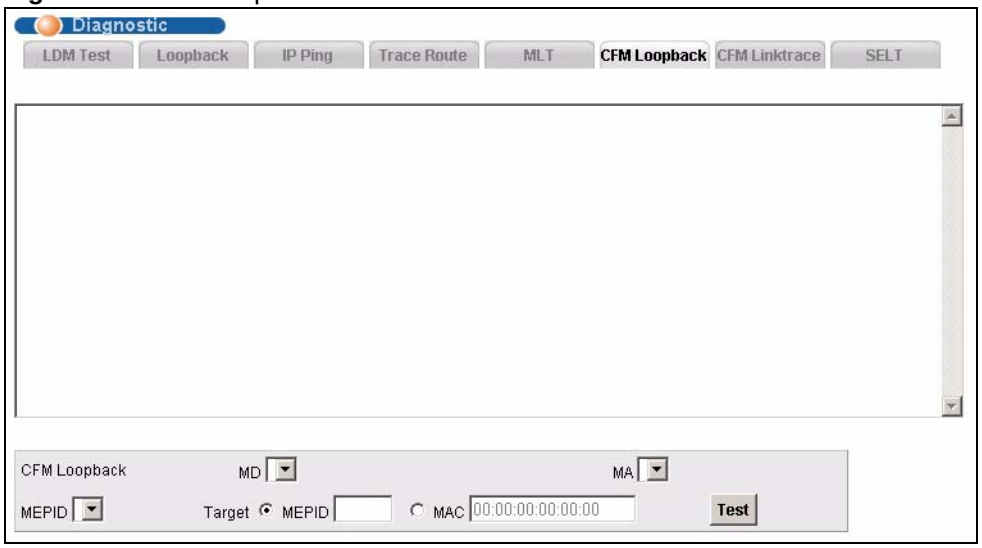
**Table 54** Diagnostic > MLT Screen

| LABEL | DESCRIPTION |
|---|---|
| Forced | Select this to perform the test(s) immediately, even if the specified port is in use. |
| All | Perform all the MLT tests. |
| AC Voltage | Test the line's AC voltage. |
| DC Voltage | Test the line's DC voltage. |
| Load Resistance | Test the line's load resistance. |
| Isolation Resistance | Test the line's isolation resistance. |
| Capacitor | Test the line's capacitance. |
| Ring Voltage | Test the line's ring voltage. |
| Metering Voltage | Test the line's metering voltage. |
| REN Value | Test the line's ringer equivalent number. |
| Draw and Break Dial Tone | Test the elapsed time between a line going off-hook and the dial tone beginning. |
| Pulse and DTMF Digit | Detect and measure pulse digits and DTMF digits on the line. |
| Receiver Off-Hook | Test whether the line is off-hook, on-hook, short, or open. |

## 8.7 CFM Loopback Screen

Click **Diagnostic** > **CFM Loopback** in the navigation panel to display this screen. Use this screen to perform a loopback connectivity test on a link.

**Figure 69** CFM Loopback



The following table describes the labels in this screen.

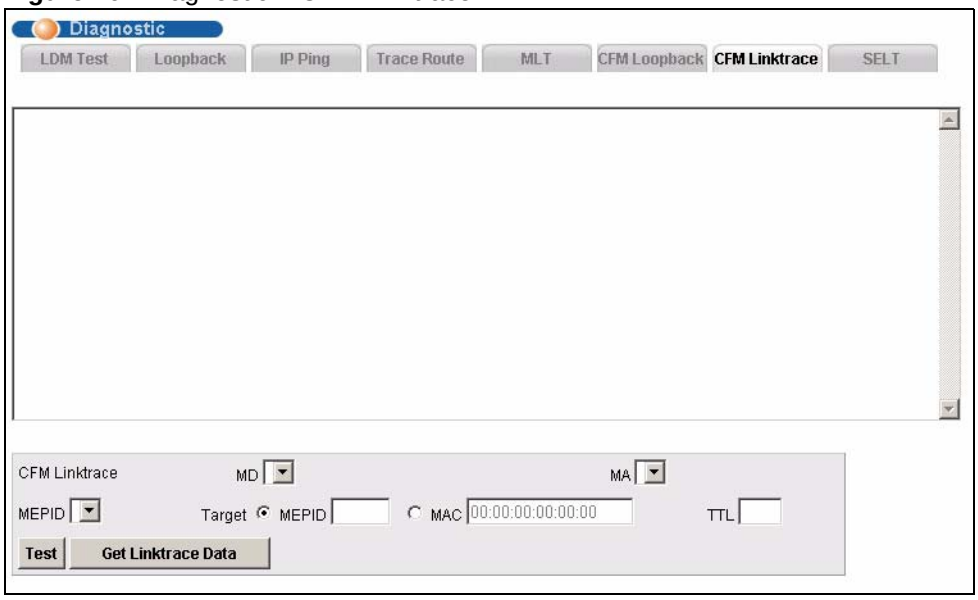
**Table 55** CFM Loopback

| LABEL | DESCRIPTION |
|---|---|
| MD | Select an MD name.<br>If the drop-down list is empty, create an MD in the **Switch** > **CFM** screen. |
| MA | Select an MA name under the selected MD.<br>If the drop-down list is empty, create an MA in the **Switch** > **CFM** > **CFM maintenance association** screen. |
| MEPID | Select an MEP ID to specify which MEP port on the device initiates the test.<br>If the drop-down list is empty, create an MA in the **Switch** > **CFM** > **CFM maintenance association** > **CFM endpoint** screen. |
| Target | Specify the destination of the link you are checking. You can select **MEPID** and enter a remote MEP's ID or select **MAC** and enter a remote MEP port's MAC address. |
| Test | Click this to start the loopback connectivity test. |

## 8.8 CFM Linktrace Screen

Click **Diagnostic** > **CFM Linktrace** in the navigation panel to display this screen. Use this screen to perform a link trace connectivity test on a link.

**Figure 70** Diagnostic > CFM Linktrace




The following table describes the labels in this screen.

**Table 56** Diagnostic > CFM Linktrace

| LABEL | DESCRIPTION |
|---|---|
| MD | Select an MD name.<br>If the drop-down list is empty, create an MD in the **Switch** > **CFM** screen. |
| MA | Select an MA name under the selected MD.<br>If the drop-down list is empty, create an MA in the **Switch** > **CFM** > **CFM maintenance association** screen. |

**Table 56** Diagnostic > CFM Linktrace (continued)

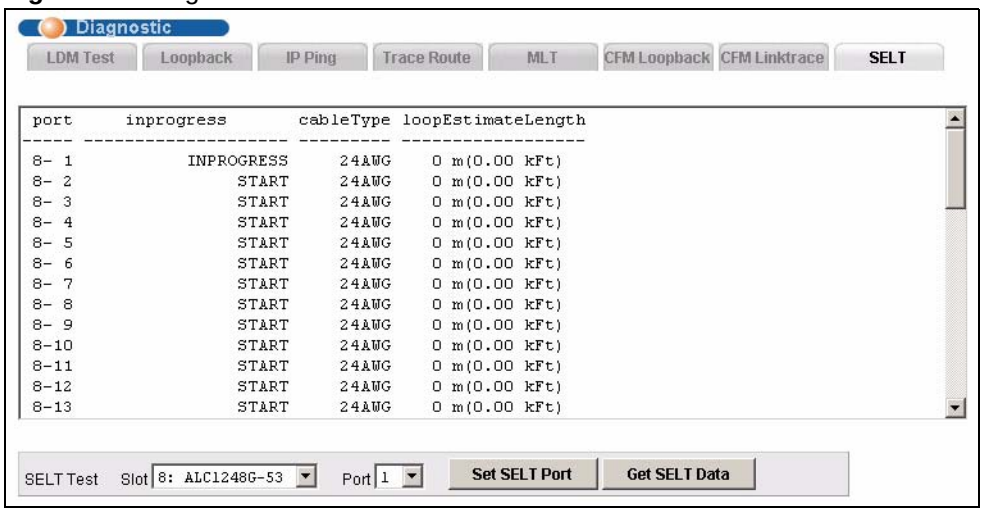
| LABEL | DESCRIPTION |
|---|---|
| MEPID | Select an MEP ID to specify which MEP port on the device initiates the test.<br>If the drop-down list is empty, create an MA in the **Switch** > **CFM** > **CFM maintenance association** > **CFM endpoint** screen. |
| Target | Specify the destination of the link you are checking. You can select **MEPID** and enter a remote MEP's ID or select **MAC** and enter a remote MEP's MAC address. |
| TTL | Set the maximum time period (1~63 seconds) the link trace test can continue for without a response. |
| Test | Click this to start the link trace connectivity test. |
| Get Linktrace Data | Click this to display detailed results of the test. |

## 8.9 SELT Test Screen

Click **Diagnostic** > **SELT Test** in the navigation panel to display this screen. Use this screen to perform a SELT (Single End Loop Test) on a port to check the distance to the subscriber's location. Not all line cards support the SELT test.

The port must have an open loop. There cannot be a DSL device, phone, fax machine or other device connected to the subscriber's end of the telephone line.

**Figure 71** Diagnostic > SELT


Diagnostic
LDM Test
Loopback
IP Ping
Trace Route
MLT
CFM Loopback
CFM Linktrace
SELT
port inprogress cableType loopEstimateLength
8- 1 INPROGRESS 24AWG 0 m(0.00 kFt)
8- 2 START 24AWG 0 m(0.00 kFt)
8- 3 START 24AWG 0 m(0.00 kFt)
8- 4 START 24AWG 0 m(0.00 kFt)
8- 5 START 24AWG 0 m(0.00 kFt)
8- 6 START 24AWG 0 m(0.00 kFt)
8- 7 START 24AWG 0 m(0.00 kFt)
8- 8 START 24AWG 0 m(0.00 kFt)
8- 9 START 24AWG 0 m(0.00 kFt)
8-10 START 24AWG 0 m(0.00 kFt)
8-11 START 24AWG 0 m(0.00 kFt)
8-12 START 24AWG 0 m(0.00 kFt)
8-13 START 24AWG 0 m(0.00 kFt)
SELT Test
Slot 8: ALC1248G-53
Port 1
Set SELT Port
Get SELT Data

The following table describes the labels in this screen.

**Table 57** Diagnostic > SELT

| LABEL | DESCRIPTION |
|---|---|
| SELT Test | Select slot and port numbers from the **Slot** (not all cards support the SELT test) and **Port** drop-down list boxes and click **Set SELT Port** to perform a Single End Loop Test (SELT) on the specified port. This test checks the distance to the subscriber's location.<br>The SELT takes at least fifteen seconds. To check the status of the SELT or to look at the results when the SELT is complete, select a port number from the **Port** drop-down list box and click **Get SELT Data**. The results tell you what gauge of telephone wire is connected to the port and the approximate length of the line. |

# 9

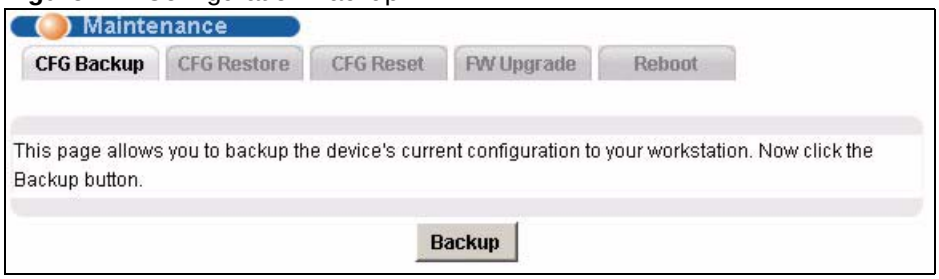
# Maintenance Screens

This chapter explains how to use the maintenance screens.

## 9.1 Configuration Backup Screen

Click **Maintenance** > **Config Backup** in the navigation panel to open the following screen. Use this screen to back up your system configuration. This allows you to create various “snap shots” of your device from which you may restore at a later date.

**Figure 72** Configuration Backup



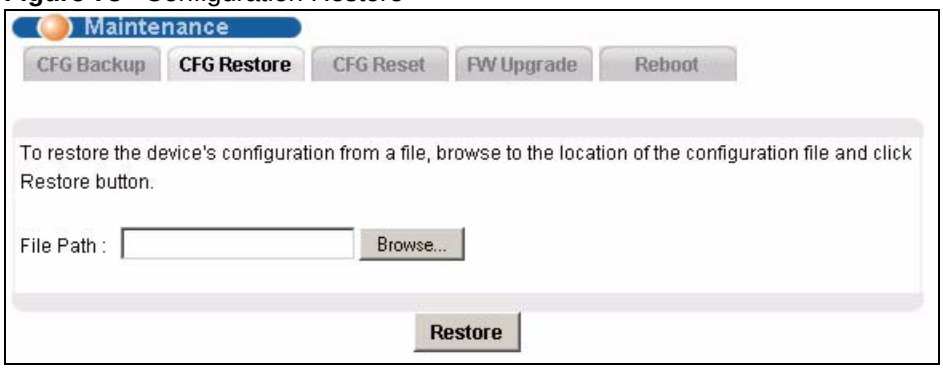

1. Click **Backup** to save your device’s configuration to your computer.
2. In the **Save As** screen, choose a location to save the file on your computer from the **Save in** drop-down list box and type a descriptive name for it in the **File name** list box. Click **Save** to save the configuration file to your computer.

You can change the “.dat” file to a “.txt” file and still upload it to the system. See the chapters on commands to edit the configuration text file.

## 9.2 Configuration Restore Screen

Click **Maintenance** > **Config Restore** in the navigation panel to open the following screen. Use this screen to load a configuration file from your computer to the system.

**Figure 73** Configuration Restore




Type the path and file name of the configuration file you wish to restore in the **File Path** text box or click **Browse** to display a **Choose File** screen from which you can locate it. After you have specified the file, click **Restore**. "conf-0" is the name of the configuration file on the system, so your backup configuration file is automatically renamed when you restore using this screen.

## 9.3 Configuration Reset Screen

Click **Maintenance** > **Config Reset** in the navigation panel to open the following screen. Use this screen to clear all system configuration information that you have configured and return to the factory defaults.

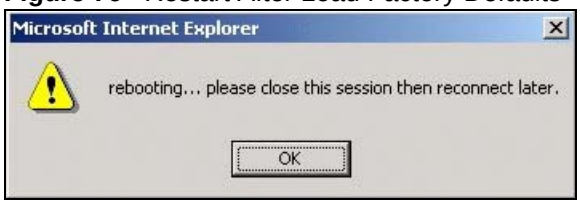
**Figure 74** Configuration Reset

Click **Reset** to return the system to the factory default settings.

**Figure 75** Confirm Restore Factory Default Settings

Click **OK** to begin resetting all system configurations to the factory defaults and then wait for the system to restart. This takes up to two minutes. If you want to access the web configurator again, you may need to change the IP address of your computer to be in the same subnet as that of the default system IP address (192.168.1.1 for in-band, 192.168.0.1 for out-of-band).

**Figure 76** Restart After Load Factory Defaults

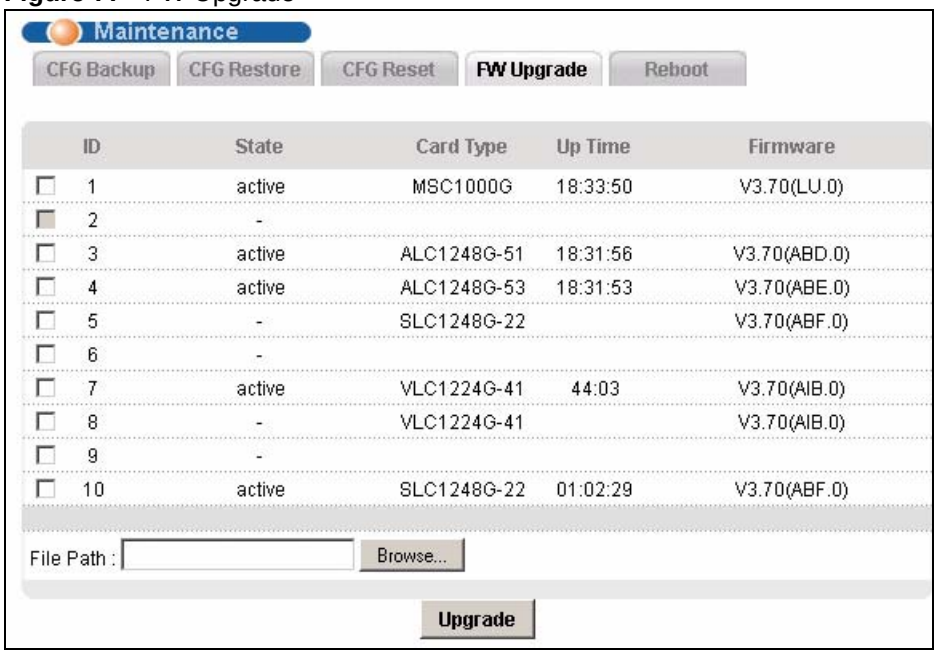



## 9.4 Firmware Upgrade Screen

Click **Maintenance** > **Firmware Upgrade** in the navigation panel to open the following screen. Use this screen to view your current firmware version number and upload firmware to cards in the system. Make sure you have downloaded (and unzipped) the correct model firmware and version to your computer before uploading to the card.

Be sure to upload the correct model firmware as uploading the wrong model firmware may damage a card.

**Figure 77** FW Upgrade




The MSC1000G supports dual firmware images, ras-0 and ras-1. You can switch them from one to the other by selecting the **Boot Image** and clicking **Apply**. The system doesn't reboot after it completes a firmware upgrade.

Select the check boxes beside the card or cards to which you want to upload firmware. You can simultaneously upload firmware to cards of the same type. You can only upload firmware to cards that are active.

Type the path and file name of the firmware file you wish to upload in the **File Path** text box or click **Browse** to locate it. After you have specified the file, click **Upgrade**.

After the firmware upgrade process is complete, use this screen to verify your current firmware version number.

## 9.5 Reboot Screen

Click **Maintenance** > **Reboot** in the navigation panel to open the following screen. Use this screen to restart the system without physically turning the power off.

**Figure 78** Reboot

Use the **Config Save** screen first if you want to save the system's current configuration. Otherwise, using the **Reboot** button will return the system to the configuration that was last saved to nonvolatile memory.

Click the **Reboot** button to display the following screen.

**Figure 79** Confirm Restart

Click **OK**.

**Figure 80** Rebooting

Click **OK** again and wait for the system to restart. This takes up to two minutes.

# 10

# Multicast Screens

This chapter describes the **Multicast** screens.

## 10.1 IGMP Introduction

Traditionally, IP packets are transmitted in one of either two ways - Unicast (1 sender to 1 recipient) or Broadcast (1 sender to everybody on the network). Multicast delivers IP packets to just a group of hosts on the network.

IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a multicast group - it is not used to carry user data. Refer to RFCs 1112, 2236 and 3376 for information on IGMP versions 1, 2 and 3 respectively.

### 10.1.1 IP Multicast Addresses

In IPv4, a multicast address allows a device to send packets to a specific group of hosts (multicast group) in a different sub-network. A multicast IP address represents a traffic receiving group, not individual receiving devices. IP addresses in the Class D range (224.0.0.0 to 239.255.255.255) are used for IP multicasting. Certain IP multicast numbers are reserved by IANA for special purposes (see the IANA web site for more information).

### 10.1.2 IGMP Snooping

A layer-2 switch can passively snoop on IGMP Query, Report and Leave (IGMP versions 2 and 3) packets transferred between IP multicast routers/switches and IP multicast hosts to learn the IP multicast group membership. It checks IGMP packets passing through it, picks out the group registration information, and configures multicasting accordingly. IGMP snooping allows the system to learn multicast groups without you having to manually configure them.

The system forwards multicast traffic destined for multicast groups (that it has learned from IGMP snooping or that you have manually configured) to ports that are members of that group. The system discards multicast traffic destined for multicast groups that it does not know. IGMP snooping generates no additional network traffic, allowing you to significantly reduce multicast traffic passing through your device.

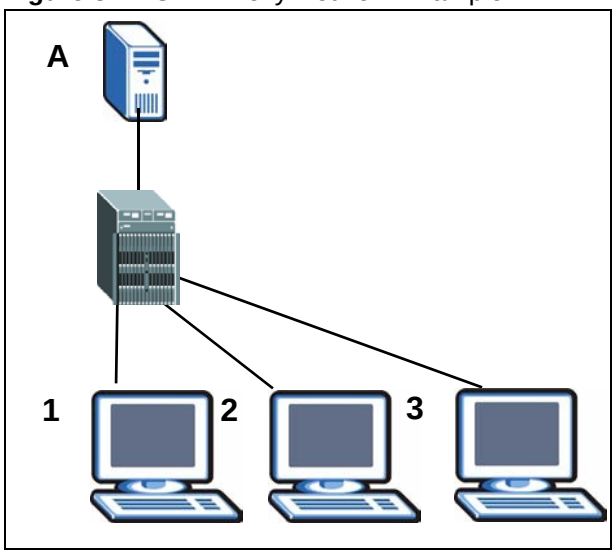
### 10.1.3 IGMP Proxy

To allow better network performance, you can use IGMP proxy instead of a multicast routing protocol in a simple tree network topology.

In IGMP proxy, an upstream interface is the port that is closer to the source (or the root of the multicast tree) and is able to receive multicast traffic. There should only be one upstream interface (also known as the query port) on the system to limit bandwidth use. A downstream interface is a port that connects to a host (such as a computer). A query VLAN determines which ports are downstream interfaces.

The following figure shows a network example where A is the multicast source while computers 1, 2 and 3 are the receivers. In the figure A is connected to the upstream interface and 1, 2 and 3 are connected to the downstream interface.

**Figure 81** IGMP Proxy Network Example




The system will not respond to IGMP join and leave messages on the upstream interface. The system only responds to IGMP query messages on the upstream interface. The system sends IGMP query messages to the hosts that are members of the query VLAN.

The system only sends an IGMP leave messages via the upstream interface when the last host leaves a multicast group.

One of the Ethernet ports acts as the upstream interface. By default, the DSL ports are set as the downstream interfaces.

The switch does not allow a subscriber port to send multicast traffic (except static multicast traffic) to an uplink port. Only the uplink port can forward multicast traffic to the subscriber port(s).

## 10.1.4 IGMP Snooping and Proxy Note

The IES-5000 acts as an IGMPv3 client host for an edge IGMPv3 multicast router and as a IGMPv2/v3 router for IGMPv2/v3 client hosts (subscribers). The IES-5000 can recognize IGMPv3 protocol messages and forward them towards the IGMP multicast router. It does not support full-featured IGMPv3 functions like source IP address control specified in RFC 3376.

### 10.1.5 IGMP Fast Leave

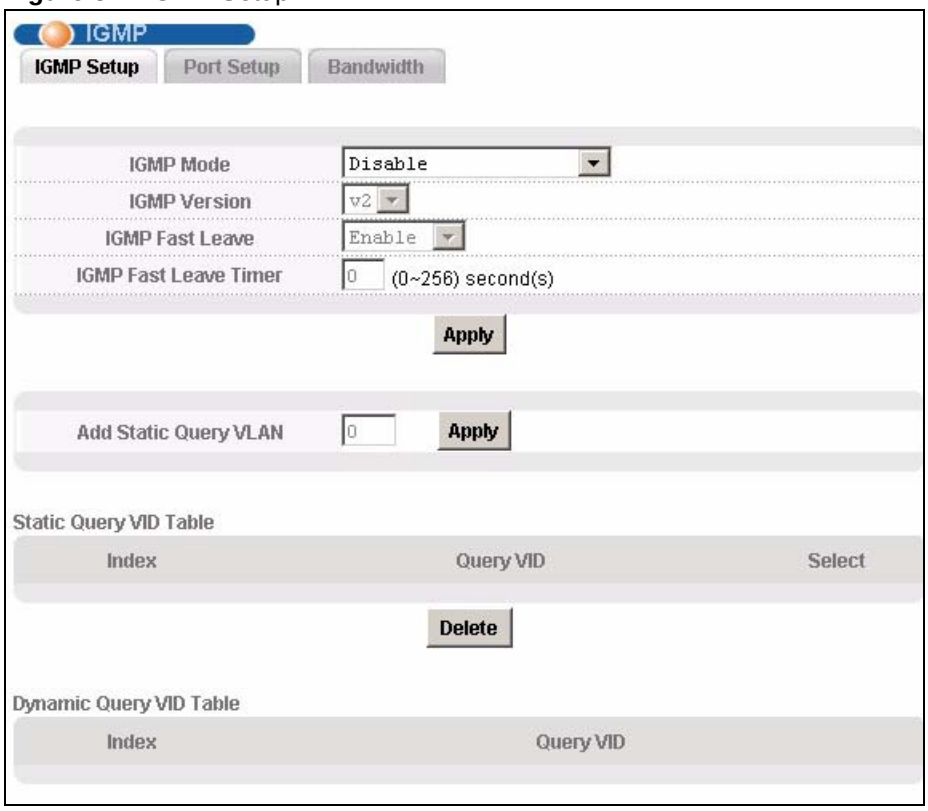
When a host leaves a multicast group (224.1.1.1), it sends an IGMP leave message to inform all routers (224.0.0.2) in the multicast group. When a router receives the leave message, it sends a specific query message to all multicast group (224.1.1.1) members to check if any other hosts are still in the group. Then the router deletes the host's information.

With the IGMP fast leave feature enabled, the router (DSLAM) removes the host's information from the group member list once it receives a leave message from a host and the fast leave timer expires.

## 10.2 IGMP Setup Screen

Click **Multicast** > **IGMP** in the navigation panel to display the screen shown next. Use this screen to configure your IGMP settings.

**Figure 82** IGMP Setup



The following table describes the labels in this screen.

**Table 58** IGMP Setup

| LABEL | DESCRIPTION |
|---|---|
| IGMP Mode | Select **Enable_IGMP_Snooping** to have the system passively learn multicast groups.<br>Select **Enable_IGMP_Proxy** to have the system proxy multicast traffic.<br>Select **Disable** to have the system not use either IGMP proxy or snooping. |
| IGMP Version | Select which version of IGMP you want the system to support. Select IGMPv2 (**V2**) or IGMPv3 (**V3**). If you select IGMPv2, the system discards IGMPv3 packets. This provides better security if none of the devices in the network use IGMPv3. If you select IGMPv3, the system recognizes both IGMPv2 and IGMPv3. |
| IGMP Fast Leave | Select **Enable** to enable IGMP fast leaving. In IPTV applications, this feature allows user to quickly change video channels and enhances the user experience. See Section 10.1.5 on page 169 for more information.<br>Select **Disable** to turn this feature off. |
| IGMP Fast Leave Timer | Specify the time duration (0~256 seconds) the device requires to switch between two video channels. |
| Apply | |
| Add Static Query VID | Type the number for an IGMP proxy VLAN and click **Apply** to add a static VLAN on which the system sends IGMP query messages. This should be the number of a subscriber VLAN. The VLAN will appear in the **Static Query VID Table**. You must configure the system's VLAN settings before you can set static query VIDs. |
| Static Query VID Table | This table lists the manually added VLANs on which the system sends IGMP query messages. These are multicast service subscriber VLANs.<br>Click **Delete** to remove the selected entry. |
| Dynamic Query VID Table | This table lists the IGMP query VLANs that the system has dynamically learned via IGMP snooping or IGMP proxy. These are VLANs on which the system sends IGMP query messages. They are multicast service subscriber VLANs. |

## 10.3 IGMP Filtering

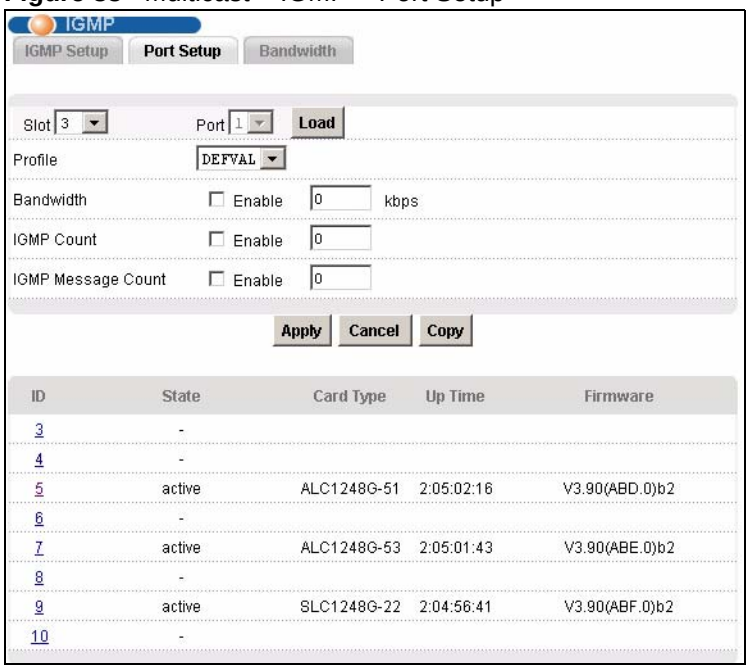
With the IGMP filtering feature, you can set which IGMP groups a subscriber on a port can join. This allows you to control the distribution of multicast services (such as content information distribution) based on service plans and types of subscription.

You can set the device to filter the multicast group join reports on a per-port basis by configuring an IGMP filtering profile and associating the profile to a port.

### 10.3.1 IGMP Port Setup Screen

Click **Multicast > IGMP > Port Setup** to open the following screen.

**Figure 83** Multicast > IGMP > Port Setup

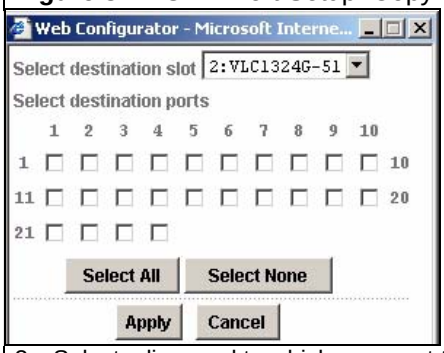



The following table describes the labels in this screen.

**Table 59** IGMP Port Setup

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the number of a line card's slot. |
| Port | Select the number of a DSL port on the line card. |
| Load | Click **Load** to retrieve the port's IGMP filter profile setting and display it in the **Profile** drop-down list box. |
| Profile | Select an IGMP filtering profile. |
| Bandwidth | Select **Enable** and enter the maximum accumulated bandwidth (in Kbps) allowed for the multicast traffic flowing through the port. |
| IGMP Count | Select **Enable** and enter the maximum number of multicast groups of which the port can be a member. |
| IGMP Message Count | Select **Enable** and enter the maximum number of multicast packets allowed to flow through the port in a second. |
| Apply | Click **Apply** to have the specified DSL port use the IGMP port setting. |
| Cancel | Click **Cancel** to close the screen without saving your changes. |

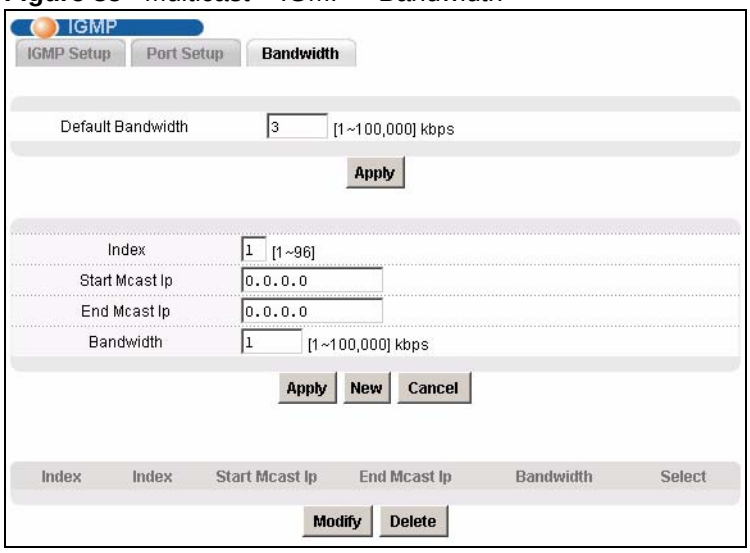
**Table 59** IGMP Port Setup (continued)

| LABEL | DESCRIPTION |
|---|---|
| Copy | Do the following to copy IGMP port settings from one DSL port to another DSL port or ports.<br>1. Select the radio button of the DSL port from which you want to copy IGMP filter profile settings.<br>2. Click **Copy** to open the following screen.<br><br>**Figure 84** IGMP Port Setup: Copy<br>  <br><br>3. Select a line card to which you want to copy settings.<br>4. Select the check boxes of the DSL ports on the line card to which you want to copy the IGMP filter profile setting. Click **Select All** to mark all of the port check boxes or click **Select None** to clear all of the port check boxes.<br>5. Click **Apply** to copy the IGMP filter settings to all of the ports that you have selected in this screen. Click **Cancel** to close the screen without saving changes. |
| ID | This column lists the slot numbers of the line cards. Click the ID number of an active line card to go to a screen where you can copy a DSL port's IGMP filter profile setting to another DSL port. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Chapter 37 on page 767 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 10.3.2 IGMP Bandwidth Screen

Click **Multicast** > **IGMP** > **Bandwidth** to open the following screen.

**Figure 85** Multicast > IGMP > Bandwidth




The following table describes the labels in this screen.

**Table 60** Multicast > IGMP > Bandwidth

| LABEL | DESCRIPTION |
|---|---|
| Default Bandwidth | Select the maximum bandwidth allowed for multicast traffic for which you have not configured bandwidth requirements yet. The multicast bandwidth settings on ports (see the **Bandwidth** field below) have higher priority over this default setting. Click **Apply** to save the changes in this section to the system's volatile memory. |
| Index | Specify the index number of a multicast group. |
| Start Mcast Ip | Enter the start IP address in the range of multicast IP addresses to which the bandwidth setting applies. |
| End Mcast Ip | Enter the end IP address in the range of multicast IP addresses to which the bandwidth setting applies |
| Bandwidth | Select **Enable** to enable bandwidth control and type a maximum bandwidth (in kbps) allowed for the traffic flow on a port. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | After you click **Apply**, entries display in the first table so you can edit them. Click **New** if you want to configure a different static multicast group. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Index | This displays the index number of records in the multicast group bandwidth control table. |
| Start Mcast Ip | This displays the start IP address in the range of multicast IP addresses to which the bandwidth settings applies. |
| End Mcast Ip | This displays the end IP address in the range of multicast IP addresses to which the bandwidth settings applies. |
| Bandwidth | This displays specified the bandwidth applied to the multicast hosts. |
| Modify | Select a multicast group's radio button and click **Modify** to display the multicast group in the table above so you can edit it. |
| Delete | Select a multicast group's radio button and click **Delete** to remove the multicast group. |

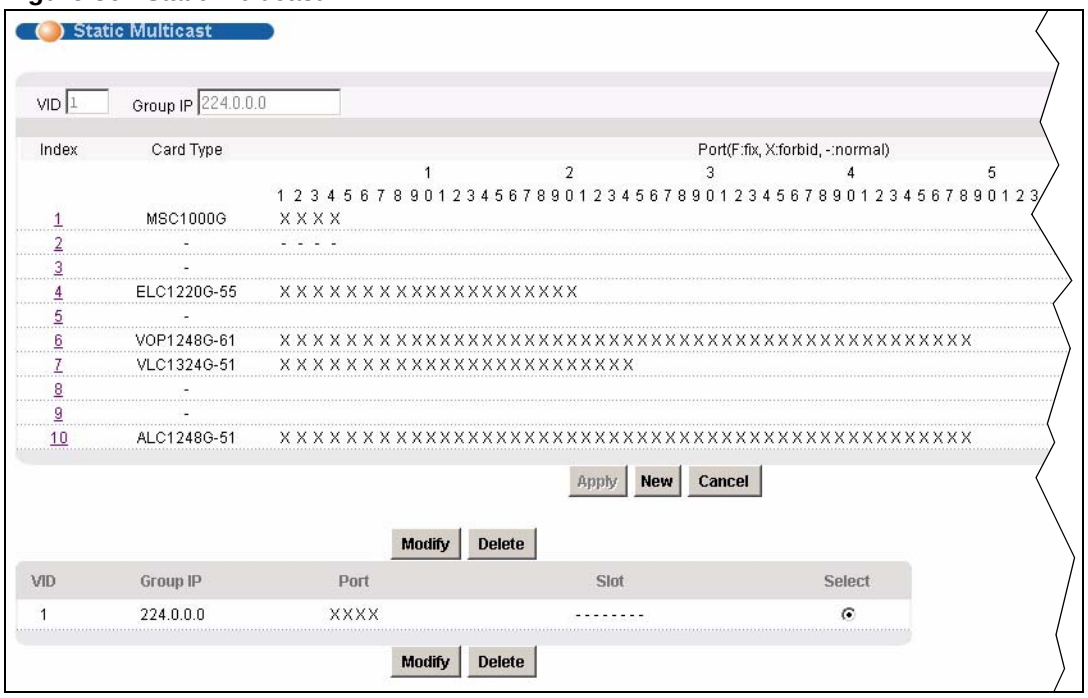
## 10.4 Static Multicast

Use static multicast to allow incoming frames based on multicast MAC address(es) that you specify. This feature can be used in conjunction with IGMP snooping to allow multicast MAC address(es) that are not learned by IGMP snooping or IGMP proxy. Use static multicast to pass routing protocols, such as RIP and OSPF.

## 10.5 Static Multicast Screen

Click **Multicast** > **Static Multicast** in the navigation panel to display the screen shown next.

**Figure 86** Static Multicast


Static Multicast
VID 1
Group IP 224.0.0.0
Index
Card Type
Port(F:fix, X:forbid, -:normal)
1 2 3 4 5
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3
1 MSC1000G X X X X
2 - - - - -
3 -
4 ELC1220G-55 X X X X X X X X X X X X X X X X X X X X
5 -
6 VOP1248G-61 X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X
7 VLC1324G-51 X X X X X X X X X X X X X X X X X X X X X X X X
8 -
9 -
10 ALC1248G-51 X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X
Apply
New
Cancel
Modify
Delete
VID
Group IP
Port
Slot
Select
1
224.0.0.0
XXXX
--------
Modify
Delete

The following table describes the related labels in this screen.

**Table 61** Static Multicast

| LABEL | DESCRIPTION |
|---|---|
| VID | Type the number of the VLAN that this static multicast group is to use. |
| Group IP | This is the static multicast IP address. |
| Type a VID and a group IP and click **Apply** to display entries in the first table. | |
| Index | This column lists the slot numbers of the line cards. Click the number of an active line card to go to a screen where you can set the membership of each of the card's ports for this static multicast group. |
| Card Type | This field displays the kind of card installed in a slot. |
| Port | This section lists the VLAN membership setting of each port on each line card. An "F" indicates that the port is a permanent member of the static multicast group. An "X" indicates that the port is forbidden (blocked) from joining the static multicast group. An "-" indicates that the port is a normal member and can join the group dynamically. |

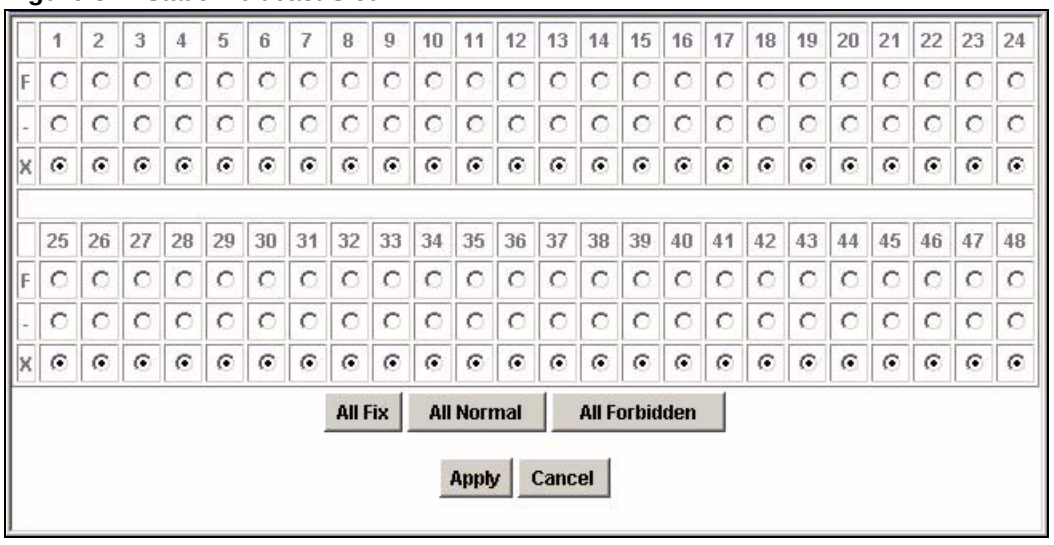
**Table 61** Static Multicast (continued)

| LABEL | DESCRIPTION |
|---|---|
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | After you click **Apply**, entries display in the first table so you can edit them. Click **New** if you want to configure a different static multicast group. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Modify | Select a static multicast group's radio button and click **Modify** to display the static multicast group in the table above so you can edit it. |
| Delete | Select a static multicast group's radio button and click **Delete** to remove the static multicast group. |
| VID | This is the number of the VLAN that this static multicast group uses. |
| Group IP | This is the static multicast IP address. |
| Port | This section lists the VLAN membership setting of the ports on the management switch card. An "F" indicates that the port is a permanent member of the static multicast group. An "X" indicates that the port is forbidden (blocked) from joining the static multicast group. An "-" indicates that the port is a normal member and can join the VLAN dynamically. |
| Slot | This section displays the numbers of any slots that are fixed members of the static multicast group. All other slots are represented by a "-". |
| Select | Select a static multicast group's radio button and then click **Modify** to be able to edit it or click **Delete** to remove it. |

## 10.5.1 Static Multicast Slot Screen

Click **Multicast** > **Static Multicast** in the navigation panel to display the **Static Multicast** screen. Type a VID and a group IP and click **Apply** to display entries in the first table. Click the slot number of an active line card to open the following screen.

**Figure 87** Static Multicast Slot



The following table describes the related labels in this screen.

**Table 62** Static Multicast Slot

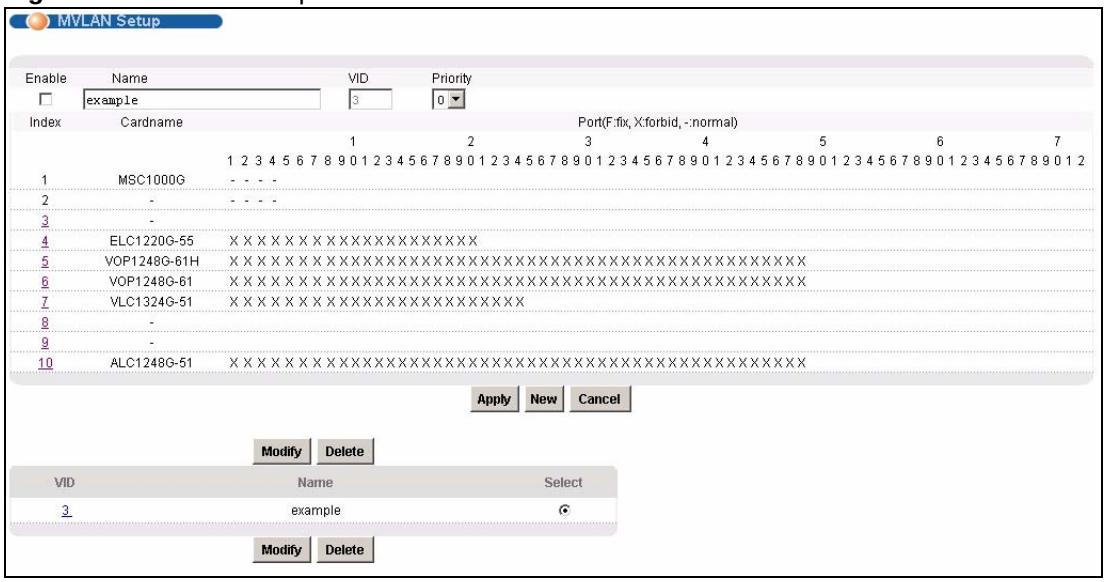
| LABEL | DESCRIPTION |
|---|---|
| 1~X | The numbers represent the individual ports on the card.<br>Use the **F**, **-**, and **X** radio buttons to set each port's membership in the static multicast group.<br>Select **F** to make the port a permanent member of the static multicast group.<br>Select **-** to make the port a normal member and allow it to join the VLAN dynamically.<br>Select **X** to set the port to "forbidden" meaning it is always blocked from joining the static multicast group.<br>Use the **All Fix**, **All Normal** or **All Forbidden** button if you want to set all of the card's ports to the same membership status for this static multicast group. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to close the screen without saving your changes. |

## 10.6 MVLAN Setup Screen

Multicast VLAN allows one single multicast VLAN to be shared among different subscriber VLANs on the network. This improves bandwidth utilization by reducing multicast traffic in the subscriber VLANs and simplifies multicast group management.

Click **Multicast** > **MVLAN** in the navigation panel to display the screen shown next. Use this screen to configure MVLAN groups in this screen.

**Figure 88** MVLAN Setup


MVLAN Setup
Enable
Name
example
VID
3
Priority
0
Index
Cardname
Port(F:fix, X:forbid, -:normal)
1 2 3 4 5 6 7
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2
1 MSC1000G - - - -
2 - - - - -
3 -
4 ELC1220G-55 X X X X X X X X X X X X X X X X X X X X
5 VOP1248G-61H X X X X X X X X X X X X X X X X X X X

The following table describes the labels in this screen.

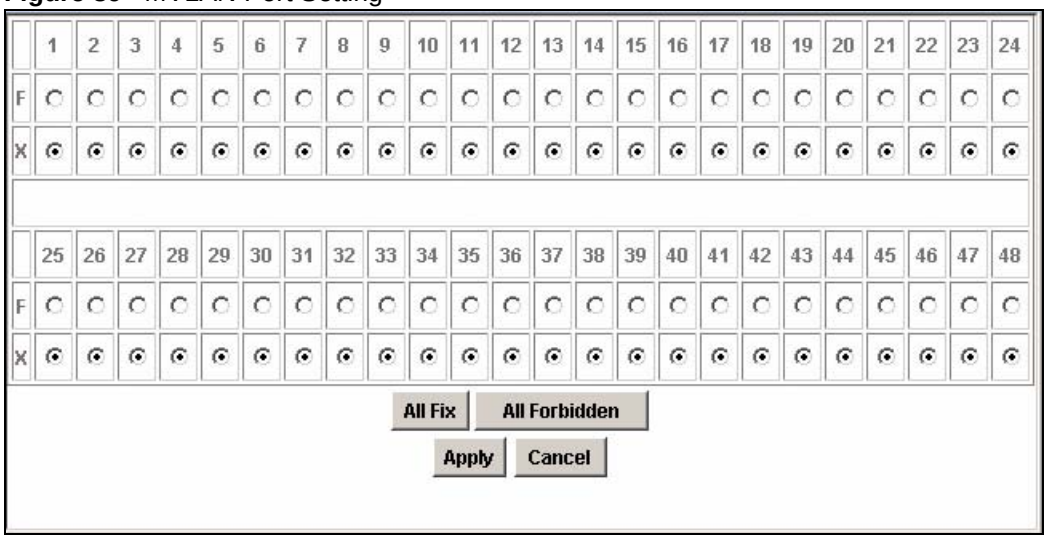
**Table 63** MVLAN Setup

| LABEL | DESCRIPTION |
|---|---|
| Enable | Select this check box to turn on the MVLAN. |
| Name | Enter a descriptive name for this MVLAN for identification purposes. |
| VID | Enter the VLAN ID (VLAN Identifier) for this MVLAN; the valid range is between 1 and 4094. |
| Priority | Specify the IEEE 802.1p priority (0~7) to use for this MVLAN's traffic. The system changes the priority in IGMP protocol messages snooped on a member subscriber port to the priority you specify here. |
| Index | This field displays the number of the card in this list. Click a non-management card's index number to open a screen where you can edit the membership settings of the cards ports. |
| Cardname | This field displays the model of the installed card. |
| Port | This section shows each port's membership in the MVLAN.<br>F: The port is a permanent member of the MVLAN.<br>X: The port is prohibited from joining the MVLAN.<br>-: MVLAN does not apply to the MSC's Gigabit Ethernet ports. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | Click **New** to start configuring the screen again. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Modify | Select a MVLAN's **Select** radio button and click **Modify** to edit the MVLAN. |
| Delete | Select a MVLAN's **Select** radio button and click **Delete** to remove the MVLAN. |
| VID | This field displays the ID number of the MVLAN. Click it to edit the multicast group that the MVLAN uses. |
| Name | This field displays the descriptive name for this MVLAN. |

## 10.7 MVLAN Port Setting Screen

Click **Multicast** > **MVLAN** in the navigation panel to display the MVLAN configuration screen. When creating or editing a MVLAN, click a line card's index link to open the following screen where you can edit the membership settings of the card's ports.

**Figure 89** MVLAN Port Setting




The following table describes the labels in this screen.

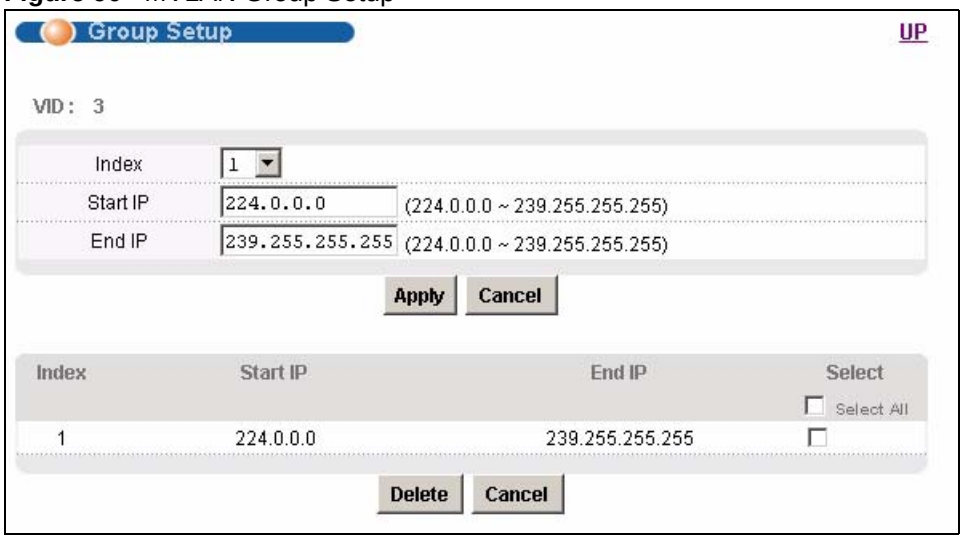
**Table 64** MVLAN Port Setting

| LABEL | DESCRIPTION |
|---|---|
| 1~X | The numbers represent the individual ports on the card.<br>Use the **F**, **-**, and **X** radio buttons to set each port's membership in the MVLAN.<br>Select **F** to make the port a permanent member of the MVLAN.<br>Select **-** to make the port a normal member and allow it to join the MVLAN dynamically.<br>Select **X** to set the port to "forbidden" meaning it is always blocked from joining the MVLAN.<br>Use the **All Fix**, **All Normal** or **All Forbidden** button if you want to set all of the card's ports to the same membership status for this MVLAN. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to close the screen without saving your changes. |

## 10.8 MVLAN Group Setup Screen

Click **Multicast** > **MVLAN** in the navigation panel to display the MVLAN configuration screen. Click a MVLAN's VID to open the following screen where you can edit the multicast group that the MVLAN uses.

**Figure 90** MVLAN Group Setup




The following table describes the labels in this screen.

**Table 65** MVLAN Group Setup

| LABEL | DESCRIPTION |
|---|---|
| VID | This is the ID number of the MVLAN. |
| Index | Select the multicast group number (1 -16). |
| Start IP | Enter a multicast IP address as the beginning of the multicast IP address range. |
| End IP | Enter a multicast IP address as the finish of the multicast IP address range. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to start configuring this section of the screen again. |
| Index | This is the multicast group number (1 -16). |
| Start IP | This is the beginning of the multicast IP address range. |
| End IP | This is the finish of the multicast IP address range. |
| Select | Select the check box in the **Select** column for an entry and click **Delete** to remove the entry. |
| Select All | Click this to select all entries in the table. |
| Delete | Select the radio button in the **Select** column for an entry. Click **Delete** to remove the entry. |
| Cancel | Click **Cancel** to start configuring this section of the screen again. |

# 11

# Subscriber Port Setup Screens

This chapter explains how to configure settings for individual subscriber ports. It also covers how to configure permanent virtual circuits.

## 11.1 ADSL Standards Overview

These are the ADSL standards and rates that the ADSL line card supports at the time of writing. The actual transfer rates will vary depending on what the subscriber's device supports, the line conditions and the connection distance.

**Table 66** ADSL Standards Maximum Transfer Rates

| STANDARD | MAXIMUM DOWNSTREAM | MAXIMUM UPSTREAM |
|---|---|---|
| G.dmt | 8160 Kbps | 1024 Kbps |
| ANSI T1.413 issue 2 | 8160 Kbps | 1024 Kbps |
| G.lite | 1536 Kbps | 512 Kbps |
| ADSL2 | 12000 Kbps | 1200 Kbps |
| ADSL2 Annex M | 12000 Kbps | 2400 Kbps |
| ADSL2+ | 25000 Kbps | 1200 Kbps |
| ADSL2+ Annex M | 25000 Kbps | 2400 Kbps |

## 11.2 VDSL Parameters

The following sections introduce some VDSL parameters.

### 11.2.1 PSD

PSD (Power Spectral Density) defines the distribution of a VDSL line's power in the frequency domain. A PSD mask is a template that specifies the maximum allowable PSD for a line.

### 11.2.2 Limit PSD Mask

To reduce the impact of interference and attenuation, ITU-T 993.2 specifies a PSD mask to limit the VDSL2 transmitters PSD at both downstream and upstream.

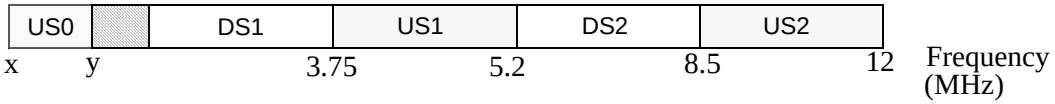
## 11.2.3 Frequency Band Plan

Each VDSL mode operates in a different frequency band allocation, resulting in different upstream and downstream speeds. Your system automatically changes the band plan based on the loop condition and loop length.

A band plan example is shown next. Band plans include an optional band (between 25 kHz and 276 kHz) controlled by “limit PSD mask”.

The optional band is used for upstream transmission which is to be negotiated during line initiation. The optional band frequency (for example, **x** and **y**) varies depending on the limit PSD mask you use.

**Figure 91** A Band Plan Example




A sample of optional band PSD masks and associated frequency bands used in the Device is shown next.

**Table 67** Optional band PSD Mask

| LIMIT PSD MASK | | OPTIONAL BAND FREQUENCY |
|---|---|---|
| nus0_d32 | = | No optional band |
| eu32_d32 | = | 25 ~ 138 kHz |
| eu36_d48 | = | 25 ~ 155.25 kHz |
| . . . | | |

The “eu” number in the limit PSD mask is a tone index. A tone spacing, 4.3125 KHz, is used for VDSL2 profile from 8a up to 17a. So “eu32” means the optional band ending at around 138 kHz. See Section 11.8.3.1 on page 206 for a list of PSD masks.

## 11.2.4 VDSL2 Profiles

The following table lists the supported Annex A VDSL profiles defined by the VDSL standard. Refer to the ITU G.993.2 specifications for more information on other profiles.

**Table 68** Supported VDSL2 Profiles (Annex A)

| PROFILE | 8A | 8B | 8C | 8D | 12A | 12B | 17A |
|---|---|---|---|---|---|---|---|
| Bandwidth (MHz) | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 | 17.66 |
| Tone | 1972 | 1972 | 1972 | 1972 | 1972 | 1972 | 4096 |
| Tone Spacing (kHz) | 4.3125 | 4.3125 | 4.3125 | 4.3125 | 4.3125 | 4.3125 | 4.3125 |
| Line Power (dBm) | +17.5 | +20.5 | +11.5 | +14.5 | +14.5 | +14.5 | +14.5 |

## 11.2.5 Configured Versus Actual Rate

You configure the maximum rate of an individual VDSL port by modifying its profile (see the **VDSL Profile Setup** screen) or assigning the port to a different profile (see the **Port Setup** screen). However, the actual rate varies depending on factors such as transmission range and interference.

## 11.2.6 Impulse Noise Protection (INP)

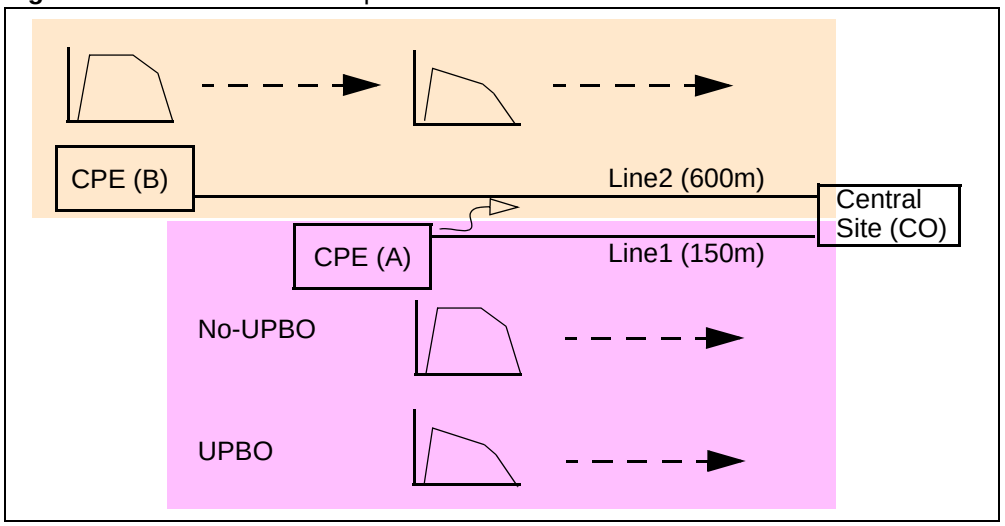
Short impulses from external sources may cause bursts of errors which could impact the multimedia (ex. voice, video, or picture) quality. VDSL2 supports Impulse Noise Protection (INP) which provides the ability to correct errors regardless of the number of errors in an errored DMT (Discrete Multi-Tone) symbol.

## 11.2.7 UPBO

In a network with varying telephone wiring lengths, the PSD on each line is different. This causes crosstalk between the lines. Enable UPBO (Upstream Power Back Off) to allow the device to adjust the transmit PSD of all lines based on a reference line length. This mitigates the upstream crosstalk on shorter loops to longer loops. It allows the switch to provide better service in a network environment with telephone wiring of varying lengths.

An example is shown below. **Line 1** and **Line 2** are in the same cable binder. Crosstalk occurs when the signal flows and is near to **CPE (A)**'s location. Besides, higher **Line 1** PSD causes higher interference to the **Line 2**. **CO** receives signal with higher attenuation. With UPBO enabled on the **CPE (A)**, it decreases the PSD level and reduces the crosstalk impact on long loops.

**Figure 92** UPBO Resolves Upstream Far-End Crosstalk



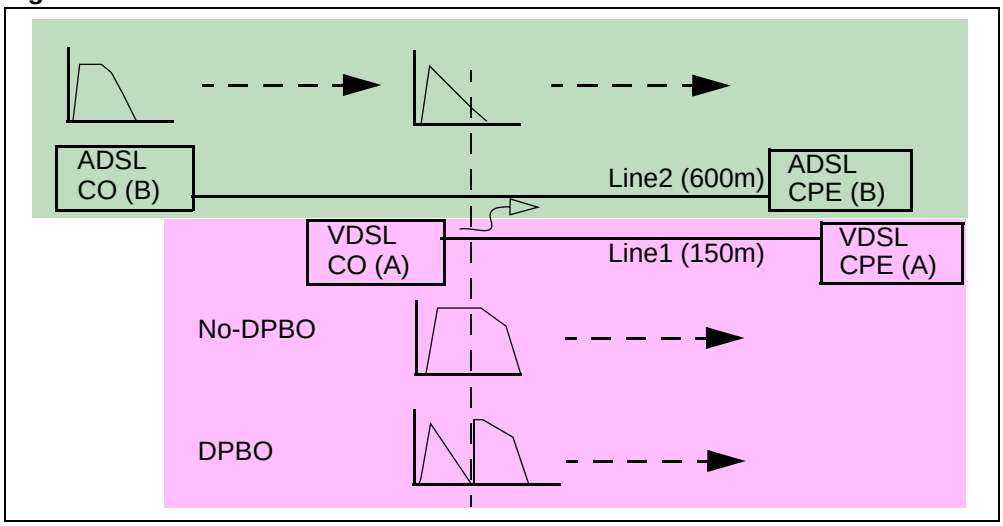
## 11.2.8 DPBO

VDSL signals may interfere with other services (such as ISDN, ADSL or ADSL2 provided by other devices) on the same bundle of lines due to downstream far-end crosstalk. DPBO (Downstream Power Back Off) can reduce performance degradation by changing the PSD level on the VDSL switch(es) at street cabinet level.

ISDN in Europe uses a frequency range of up to 80 kHz, while ISDN in Japan uses a frequency range of up to 640 kHz. ADSL utilizes the 1.1 MHz band. Both ADSL2 and ADSL 2+ utilize the 2.2 MHz band.

An example is shown next. VDSL **Line 1** and ADSL **Line 2** are in the same binder. Crosstalk occurs when the ADSL signal flows from **CO (B)** and is near to **CO (A)**'s ONU (Optical Network Unit) location. Besides, higher **Line 1** PSD causes higher interference to the **Line 2**. **CPE (B)** receives signal with higher attenuation. With DPBO enabled on the **CO (A)**, it decreases the PSD level and reduces the crosstalk impact on other service lines.

**Figure 93** DPBO Resolves Downstream Far-End Crosstalk




## 11.2.9 DPBO Electrical Length

The distance between a cabinet and the central office is an important parameter of DPBO settings as mentioned in Section 11.2.8 on page 184. The electrical length is used instead of the real physical distance according to G.997.1 format. Depending on the cable type, the line used and physical line length, you can calculate the electrical length (in dB). For example, if the distance is 1 kilometer and you use 24 AWG cable type, the electrical length 20.5 dB is recommended.

The following table displays the calculation from a real length to an electrical length.

**Table 69** Real Length to Electrical Length

| CABLE TYPE | REAL LENGTH TO ELECTRICAL LENGTH | A | B | C |
|---|---|---|---|---|
| 22 AWG | =16.2*(cable length in kilometer) | 0 | 0 | 0 |
| 24 AWG | =20.5*(cable length in kilometer) | 0 | 1 | 0 |
| 26 AWG | =25.8*(cable length in kilometer) | 0 | 1.0039065 | -0.0039065 |

## 11.2.10 Rate Adaption

Rate adaption is the ability of a device to adjust from the configured transmission rate to the attainable transmission rate automatically depending on the line quality. The VDSL transmission rate then stays at the new rate or adjusts if line quality improves or deteriorates.

The switch determines line quality using the Signal-to-Noise Ratio (SNR). SNR is the ratio of the amplitude of the actual signal to the amplitude of noise signals at a given point in time. A low SNR indicates poor line quality.

## 11.2.11 RFI (Radio Frequency Interference)

RFI is induced noise on the lines by surrounding radio frequency electromagnetic radiation from sources such as AM and HAM radio stations. Since VDSL uses a much larger frequency range that overlaps with other radio frequency systems, signals from VDSL lines and other radio systems interfere with each other. To avoid performance degradation due to RFI, set the switch to not transmit VDSL signals in the RFI band defined by the regulatory bodies (ETSI and ANSI). You can also configure your own RFI bands on the system.

## 11.2.12 Upstream Power Back Off

PSD (Power Spectral Density) defines the distribution of a VDSL line’s power in the frequency domain.

In a network with varying telephone wiring lengths, the PSD on each line is different. This causes crosstalk between the lines. Enable Upstream Power Back Off (UPBO) to allow the system to adjust the transmit PSD of all lines based on a reference line length so that the PSD at the receiving end is the same.

## 11.2.13 RFI (Radio Frequency Interference)

RFI is induced noise on the lines by surrounding radio frequency electromagnetic radiation from sources such as AM and HAM radio stations. Since VDSL uses a much larger frequency range that overlaps with other radio frequency systems, signals from VDSL lines and other radio systems interfere with each other. To avoid performance degradation due to RFI, set the switch to not transmit VDSL signals in the RFI band defined by the regulatory bodies (ETSI and ANSI). You can also configure your own RFI bands on the system.

## 11.3 Downstream and Upstream

Downstream refers to traffic going out from the line card to the subscriber's DSL modem or router. Upstream refers to traffic coming into the line card from the subscriber's DSL modem or router.

## 11.4 DSL Profiles

A DSL profile is a table that contains a list of pre-configured DSL settings. Each DSL port has one (and only one) profile assigned to it at any given time. You can configure multiple profiles, including profiles for troubleshooting. Profiles allow you to configure DSL ports efficiently. You can configure many DSL ports with the same profile, thus removing the need to configure the settings of each DSL port one-by-one. You can also change an individual DSL port's settings by assigning it a different profile.

For example, you could set up different profiles for different kinds of accounts (for example, economy, standard and premium). Assign the appropriate profile to an DSL port and it takes care of a large part of the port's configuration. You still get to individually enable or disable each port and configure port specific settings. See the chapter on profiles for how to configure DSL profiles.

## 11.5 Alarm Profiles

Alarm profiles define DSL port alarm thresholds. The system sends an alarm trap and generates a syslog entry when the thresholds of the alarm profile are exceeded. See the chapter on profiles for how to configure alarm profiles.

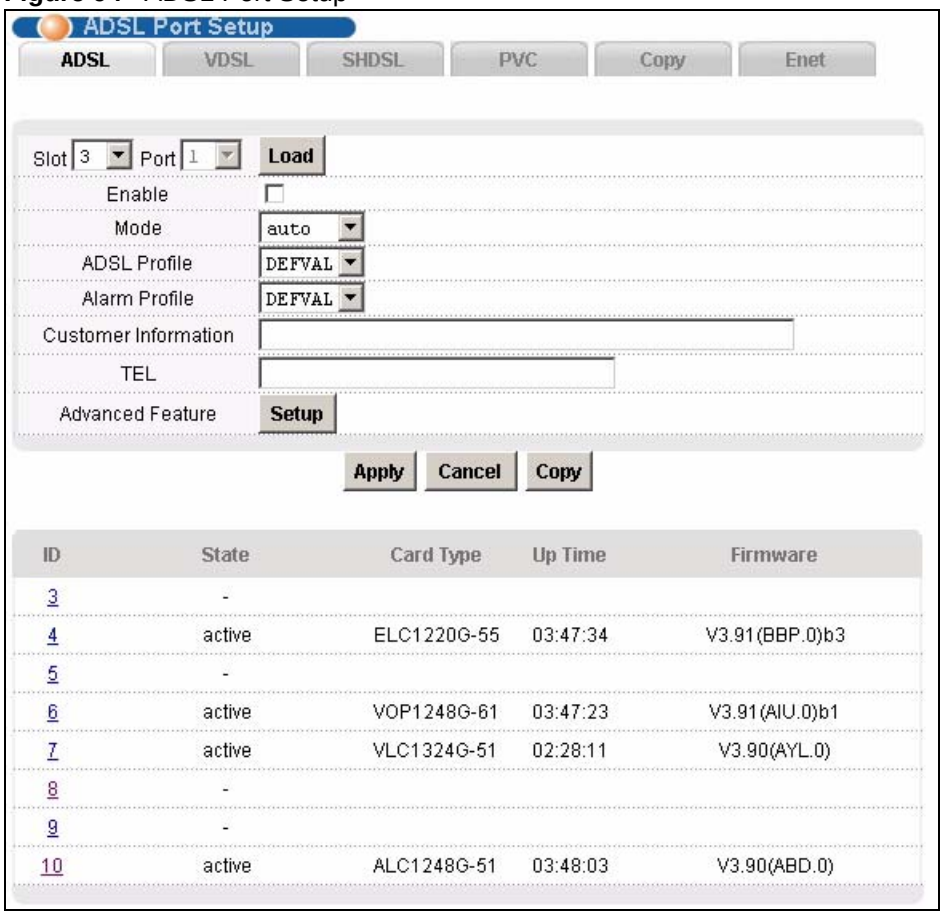
## 11.6 Default Settings

The default profiles always exists and all of the DSL ports use the default profile settings when the line card is shipped. The default profiles are named DEFVAL. Refer to the chapter on initial configuration for the settings of the default profile and DSL port default settings.

## 11.7 ADSL Port Setup

Click **Port > ADSL** in the navigation panel to open the following screen. Use this screen to configure settings for individual ADSL ports.

**Figure 94** ADSL Port Setup

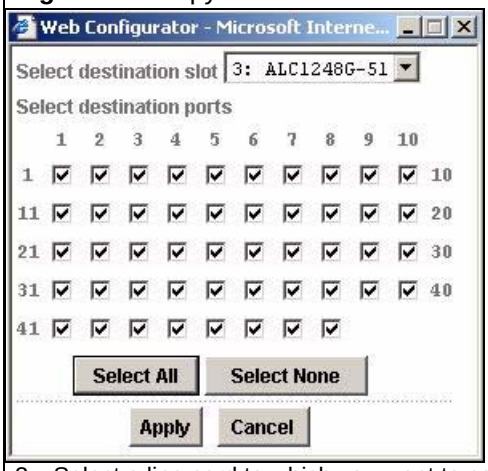



The following table describes the fields in this screen.

**Table 70** ADSL Port Setup

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the number of a line card's slot. |
| Port | Select the number of a DSL port on the line card. |
| Load | Click **Load** to display the port's settings in the fields below. |
| Enable | Select this check box to turn on this port. |
| Mode | Select the port's ADSL operational mode. Select the mode that the subscriber's device uses or auto to have the system automatically determine the mode to use. See Table 66 on page 181 for information on the individual ADSL modes. |
| ADSL Profile | Select a profile of ADSL settings (such as the transfer rate, interleave delay and signal to noise ratio settings) to assign to this port. Use the **ADSL Profile** screen to configure ADSL port profiles. |
| Alarm Profile | Select an alarm profile to define the thresholds that trigger an alarm on the port when exceeded. |
| Customer Information | Enter information to identify the subscriber connected to this ADSL port. You can use up to 31 printable English keyboard characters (including spaces and hyphens). |
| TEL | Enter information to identify the telephone number of the subscriber connected to this ADSL port. You can use up to 15 English keyboard characters (including spaces and hyphens). |

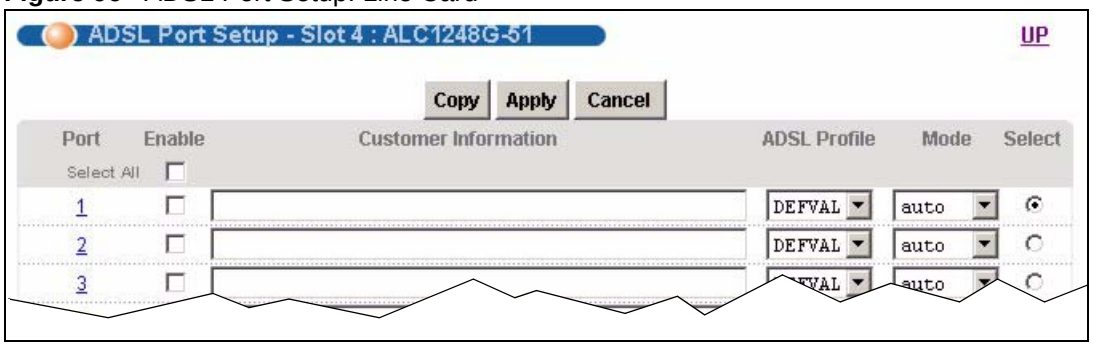
**Table 70** ADSL Port Setup (continued)

| LABEL | DESCRIPTION |
|---|---|
| Advanced Feature | Click the **Setup** button to open a screen where you can configure the ADSL port's detailed settings. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Copy | Do the following to copy DSL settings from one DSL port to another DSL port or ports.<br>1. Use the **Slot** and **Port** drop-down list boxes and the **Load** button to select the number of the DSL port from which you want to copy settings.<br>2. Click **Copy** to open the following screen.<br>**Figure 95** Copy<br>  <br>3. Select a line card to which you want to copy settings.<br>4. Select the check boxes of the DSL ports on the line card to which you want to copy the settings. Click **Select All** to mark all of the port check boxes or click **Select None** to clear all of the port check boxes.<br>5. Click **Apply** to copy the settings to all of the ports that you have selected in this screen. Click **Cancel** to close the screen without saving changes. |
| ID | This column lists the slot numbers of the line cards. Click the ID number of an active ADSL line card to go to a screen where you can copy an ADSL port's settings to another ADSL port. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 11.7.1 ADSL Port Setup Line Card Screen

Click **Port** > **ADSL** in the navigation panel to open the **ADSL Port Setup** screen. Click the slot number of an active ADSL line card to open the following screen. Use this screen to configure settings for individual ADSL ports and copy settings between ports.

**Figure 96** ADSL Port Setup: Line Card




The following table describes the fields in this screen.

**Table 71** ADSL Port Setup: Line Card

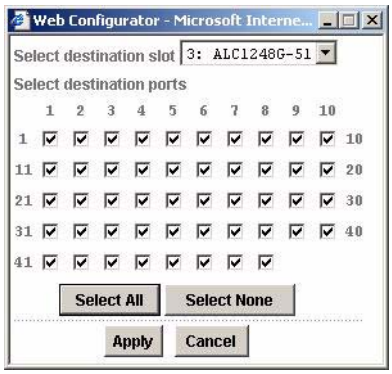
| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| Copy | Do the following to copy settings from one DSL port to another DSL port or ports.<br>1. Use the **Select** column to choose a DSL port from which you want to copy settings.<br>2. Click **Copy** to open the following screen.<br><br>**Figure 97** Copy<br>  <br><br>3. Select a line card to which you want to copy settings.<br>4. Select the check boxes of the DSL ports on the line card to which you want to copy the settings. Click **Select All** to mark all of the port check boxes or click **Select None** to clear all of the port check boxes.<br>5. Click **Apply** to copy the settings to all of the ports that you have selected in this screen. Click **Cancel** to close the screen without saving changes. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

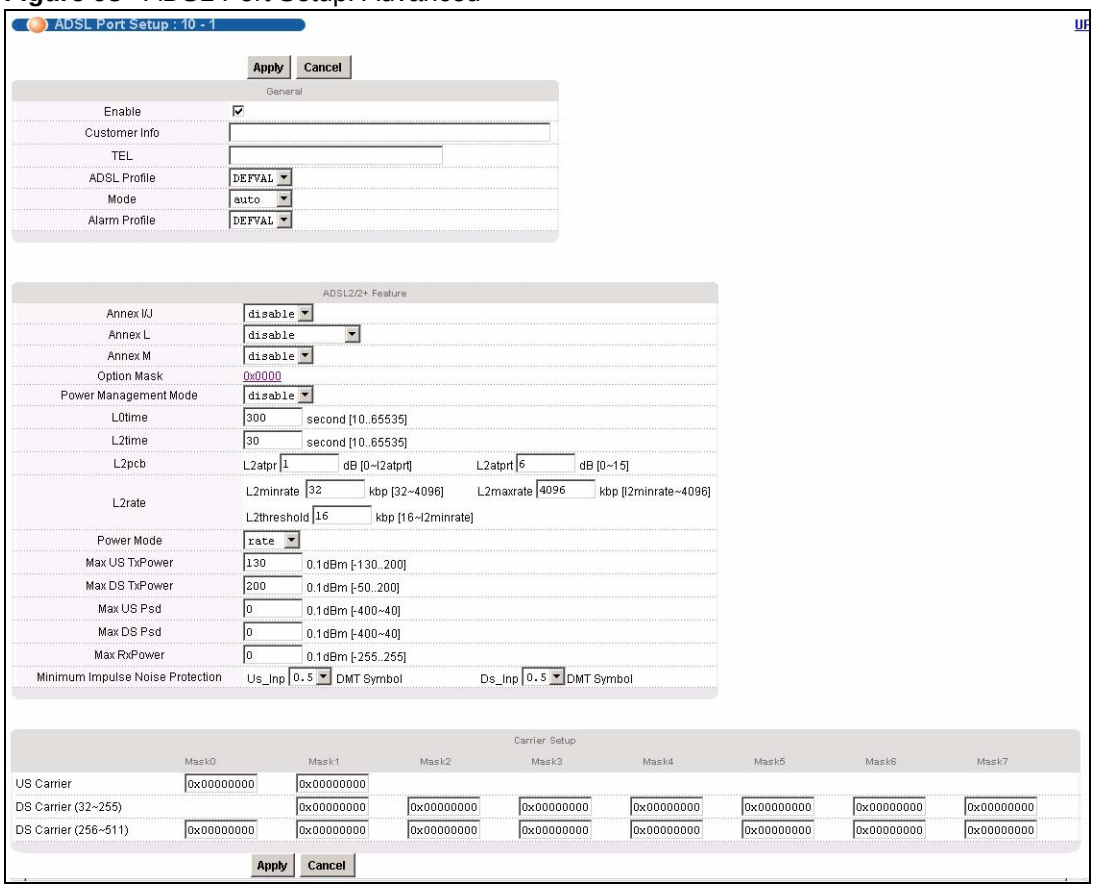
**Table 71** ADSL Port Setup: Line Card (continued)

| LABEL | DESCRIPTION |
|---|---|
| Port | These are the numbers of the DSL ports on the line card.<br>To configure advanced port settings, click a port number to display the **ADSL Port Setup** screen. |
| Enable | Select a check box in this column to turn on a port. Select the check box at the top of the column to turn on all of the line card's ports. |
| Customer Information | Enter information to identify the subscriber connected to this ADSL port. You can use up to 31 printable English keyboard characters (including spaces and hyphens). |
| ADSL Profile | Select a profile of ADSL settings (such as the transfer rate, interleave delay and signal to noise ratio settings) to assign to this port. Use the **ADSL Profile** screen to configure ADSL port profiles. |
| Mode | Select the port's ADSL operational mode. Select the mode that the subscriber's device uses or auto to have the system automatically determine the mode to use. See Table 66 on page 181 for information on the individual ADSL modes. |
| Select | Use the **Select** column to choose a DSL port from which you want to copy settings. |

## 11.7.2 ADSL Port Setup Advanced

Click **Port** > **ADSL** in the navigation panel to open the **ADSL Port Setup** screen. Click the slot number of an active ADSL line card and click a port number to display the configuration screen. Use this screen to configure an ADSL port's detailed settings.

**Figure 98** ADSL Port Setup: Advanced




The following table describes the fields in this screen.

**Table 72** ADSL Port Setup: Advanced

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Enable | Select this check box to turn on this port. |
| Customer Info | Enter information to identify the subscriber connected to this ADSL port. You can use up to 31 printable English keyboard characters (including spaces and hyphens). |
| TEL | Enter information to identify the telephone number of the subscriber connected to this ADSL port. You can use up to 15 English keyboard characters (including spaces and hyphens). |
| ADSL Profile | Select a profile of ADSL settings (such as the transfer rate, interleave delay and signal to noise ratio settings) to assign to this port. Use the **ADSL Profile** screen to configure ADSL port profiles. |
| Mode | Select an ADSL mode from the drop-down list box the card is to use. |
| Alarm Profile | Select an alarm profile to define the thresholds that trigger an alarm on the port when exceeded. |

**Table 72** ADSL Port Setup: Advanced (continued)

| LABEL | DESCRIPTION |
|---|---|
| ADSL2/2+ Feature | These are features available with ADSL2/2+. The subscriber's ADSL device must also support the individual features in order to use them. |
| Annex I/J | Enable Annex I /J to use all digital mode. With Annex I/J, the ADSL connection uses the full spectrum of the physical line and the user can not use POTS or ISDN service. This increases the upstream data rate.<br>Note: The subscriber cannot use POTS or ISDN services when you enable Annex I/J. |
| Annex L | Enable Annex L to use reach extended ADSL2. This allows increased connection distances.<br>Select **enable (narrow)** to enable extended ADSL2 in narrow Power Spectral Density (PSD) mode. Narrow mode supports longer loop lengths but has lower transmission speeds.<br>Select **enable (wide)** to enable extended ADSL2 in wide PSD mode. Narrow mode supports higher transmission speeds but requires shorter loop lengths.<br>Select **disable** to disable extended ADSL2. |
| Annex M | Enable Annex M to use double upstream mode. This has the upstream connection use tones 6 to 63. |
| Option Mask | This field displays the bit mask that represents the features that have been disabled for this connection. Click the bit mask number to open the **Option Mask** screen where you can disable attributes for the port. This is for advanced troubleshooting. |
| Power Management Mode | Enable power management to reduce the amount of power used overall and reduce the instances of the connection going down. This increases or decreases the transmission power based on line conditions. It also decreases the number of service interruptions.<br>Select **L2** to have the ADSL connection use power saving mode and reduce the rate when there is no traffic. The rate comes back up when there is traffic.<br>Select **L3** to use both power management modes L2 and L3. **L3** puts the ADSL connection to sleep mode when there is no traffic. |
| L0time | Set the time (10~ 65535 seconds) to stay in L0 mode. |
| L2time | Set the time (10~65535 seconds) to wait before performing another power trim in L2 mode. |
| L2atbr | Set the maximum aggregated power reduction (APTR) per trim in dB (0~l2atprt). |
| L2atpr | Set the maximum total aggregate power reduction in dB (0~15). |
| L2minrate | Set the minimum rate in L2 (32~4096). |
| L2maxrate | Set the maximum rate in L2 (minimum L2 rate ~ maximum upstream rate in kbps). |
| L2threshold | Set the line rate threshold to stay in L2 mode. When the rate is not within the threshold, the port switches to L0 mode immediately. |
| Power Mode | The power mode controls the connection's power adaptivity.<br>Select **fix** to set the maximum downstream transmit power to the number you specify in the **Max DS TxPower** field.<br>Select **power** to give the saving of transmission power priority over the transmission rate. The line card attempts to reduce its transmit power as much as possible while still maintaining the configured minimum rate. This only applies to the downstream connection and the ADSL operational mode must be G.dmt, ANSI T1.413 or G.lite.<br>Select **rate** to give the transmission rate priority over the saving of transmission power. The line card attempts to achieve the maximum configured transmission rate before reducing the transmit power. |

**Table 72** ADSL Port Setup: Advanced (continued)

| LABEL | DESCRIPTION |
|---|---|
| Max US TxPower | Set the maximum upstream transmit power, -130~200 in 0.1 dBm. |
| Max DS TxPower | Set the maximum downstream transmit power, -50~200 in 0.1 dBm. |
| Max US Psd | Set the maximum upstream PSD (Power Spectrum Density) mask (between -400 to 40 in units of 0.1 dBm/Hz).<br>PSD defines the distribution of a line's power in the frequency domain. A PSD mask is a template that specifies the maximum allowable PSD for a line. |
| Max DS Psd | Set the maximum downstream PSD mask (between -400 to 40 in units of 0.1 dBm/Hz). |
| Max RxPower | Set the maximum aggregate receive power at the line card's port, -255~255 in 0.1 dBm. This only applies to the ADSL2/2+ ADSL operational modes. |
| Minimum Impulse Noise Protection | Sudden spikes in the line's noise level (impulse noise) can cause errors and result in lost packets. Set the impulse noise protection minimum to have a buffer to protect the ADSL physical layer connection against impulse noise. This buffering causes a delay that reduces transfer speeds. It is recommended that you use a non-zero setting for real time traffic that has no error correction (like video-conferencing).<br>Select a number of DMT symbols to use for the minimum upstream impulse noise protection (Us_Inp) setting.<br>Select a number of DMT symbols to use for the minimum downstream impulse noise protection (Ds_Inp) setting. |
| Carrier Setup | Use this part of the screen to mask carrier tones. Masking a carrier tone disables the use of that tone on the ADSL port. Do this to have the system not use an ADSL line's tones that are known to have a high noise level.<br>The "0x" at the beginning of the mask fields indicates hexadecimal digits (0~ffffffff) are to be used. Each mask can use up to 8 hexadecimal digits. Each hexadecimal digit represents 4 tones. The hexadecimal digit is converted to binary and a '1' masks (disables) the corresponding tone. |
| US Carrier | Use these fields to disable upstream carrier tones (from 0~63).<br>Mask0 = tones 0~31<br>Mask1 = tones 32~63<br>For example,"0x00000080" in the **Mask0** field and "0x00000000" in the **Mask1** field disables upstream carrier tone 8. |
| DS Carrier (32~255) | Use these fields to disable downstream carrier tones (from 32~255).<br>Mask1 = tones 32~63<br>Mask2 = tones 64~95<br>Mask3 = tones 96~127<br>Mask4 = tones 128~159<br>Mask5 = tones 160~191<br>Mask6 = tones 192~223<br>Mask7 = tones 224~255<br>For example, "0x01000000" in the **Mask2** field and all of the other mask fields set to the default disables downstream carrier tone 89.<br>"0x03000000" in the **Mask2** field and all of the other mask fields set to the default disables downstream carrier tones 89 and 90. |

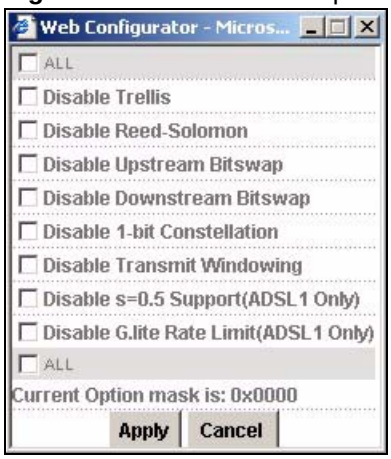
**Table 72** ADSL Port Setup: Advanced (continued)

| LABEL | DESCRIPTION |
|---|---|
| DS Carrier (256~511) | Use these fields to disable downstream carrier tones (from 256~511).<br>Mask0 = tones 256~287<br>Mask1 = tones 288~319<br>Mask2 = tones 320~351<br>Mask3 = tones 352~383<br>Mask4 = tones 384~415<br>Mask5 = tones 416~447<br>Mask6 = tones 448~479<br>Mask7 = tones 480~511<br>For example, “0x00001000” in the **Mask1** field and all of the other mask fields set to the default disables downstream carrier tone 301.<br>For another example, “0x0000f000”in the **Mask1** field and all of the other mask fields set to the default disables downstream carrier tones 301 to 304. |
| Apply | Click **Apply** to save the changes in this screen to the system’s volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the fields again. |

## 11.7.3 ADSL Option Mask Screen

Click the **Option Mask link** in the **ADSL Port Setup** > **Advanced** screen to display a pop-up screen as shown. Use this screen to disable features on a port for advanced troubleshooting.

**Figure 99** ADSL Port Setup: Advanced: Option Mask




The following table describes the fields in this screen.

**Table 73** ADSL Port Setup: Advanced: Option Mask

| LABEL | DESCRIPTION |
|---|---|
| All | Use the check boxes to disable individual features. Use the **All** check box to select every feature check box. |
| Disable Trellis | Trellis encoding helps to reduce the noise in ADSL transmissions. Trellis may reduce throughput but it makes the connection more stable. |
| Disable Reed Solomon | Reed-Solomon performs transmission error correction. |

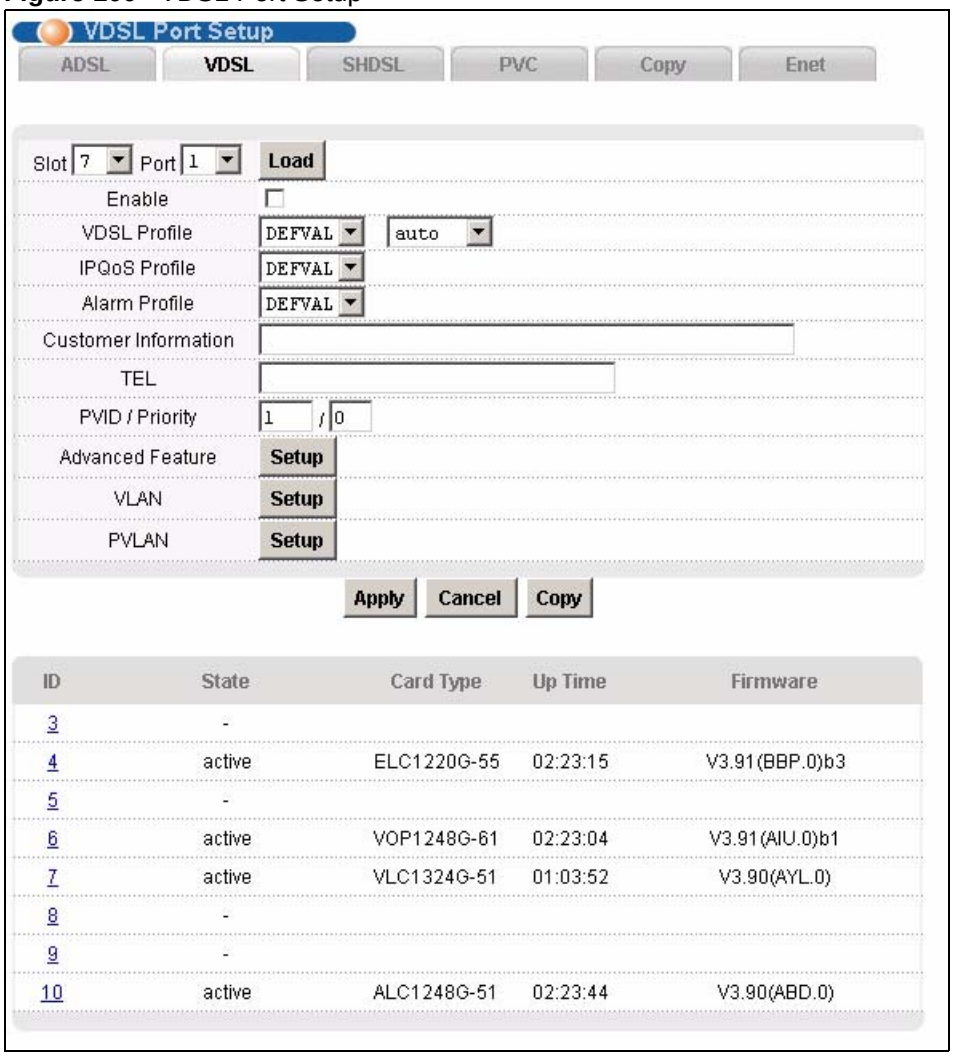
**Table 73** ADSL Port Setup: Advanced: Option Mask (continued)

| LABEL | DESCRIPTION |
|---|---|
| Disable Upstream/ Downstream Bitswap | Bit swapping allows the system to respond to noise on a tone by sending it's data on another tone. The subscriber (ATU-R) equipment must also support this in order for it to work. |
| Disable 1-bit Constellation | 1-bit constellation allows the system to send individual bits over DMT tones that can only support one bit. This allows the connection to use as many of the tones as possible. |
| Disable Transmit Windowing | Transmit windowing is only available with ADSL2+. |
| Disable S=0.5 Support(ADSL1 Only) | 0.5 support maps two Reed-Solomon code words into one data frame (instead of one) to increase the maximum G.dmt transmission rate. |
| Disable G.lite Rate Limit (ADSL1 Only) | Disabling the G.lite rate limit allows the G.lite upstream transmission rate to be greater than 512 Kbps. |
| Current Option mask is: | Selecting or clearing feature check boxes adjusts the current option mask displayed at the bottom of the screen. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to close the screen without saving your changes. |

## 11.8 VDSL Port Setup

Click **Port > VDSL** in the navigation panel to open the following screen. Use this screen to configure settings for individual VDSL ports.

**Figure 100** VDSL Port Setup




The following table describes the fields in this screen.

**Table 74** VDSL Port Setup

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the number of a line card's slot. |
| Port | Select the number of a DSL port on the line card. |
| Load | Click **Load** to display the port's settings in the fields below. |
| Enable | Select this check box to turn on this port. |
| VDSL Profile | Select a VDSL line profile to assign to this port. Use the **VDSL Profile** screen to configure VDSL port profiles.<br>Select a profile defined by the VDSL standard from the drop-down list box. Refer to Table 11.2.4 on page 182 for profile information. |
| Frequency Bandplan | Specify a band plan in this field.<br>Select **997** for symmetric connections.[A]<br>Select **998** for asymmetric connections. |
| Alarm Profile | Select an alarm profile to define the thresholds that trigger an alarm on the port when exceeded. |

**Table 74** VDSL Port Setup (continued)

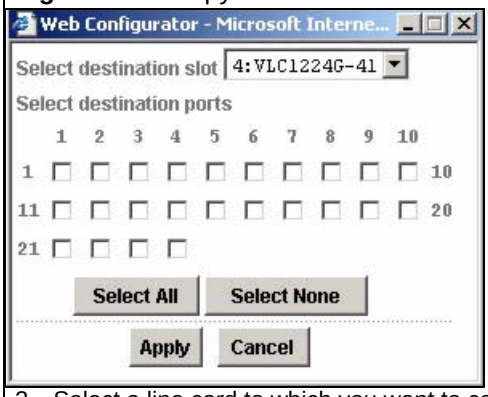
| LABEL | DESCRIPTION |
|---|---|
| Customer Information | Enter information to identify the subscriber connected to this DSL port. You can use up to 31 printable English keyboard characters (including spaces and hyphens). |
| TEL | Enter information to identify the telephone number of the subscriber connected to this DSL port. You can use up to 15 English keyboard characters (including spaces and hyphens). |
| PVID / Priority | Specify the port VLAN ID (1~4094) and IEEE 802.1p priority (0~7) to add to untagged frames received on this port. If an untagged frame matches a PVLAN setting, the system uses the PVLAN setting instead. |
| Advanced Features | Click the **Setup** button to open a screen where you can configure the VDSL port's detailed settings. |
| VLAN | Click the **Setup** button to open a screen where you can configure the VLAN settings for the VDSL port. |
| PVLAN | Click the **Setup** button to open a screen where you can configure Protocol VLAN (PVLAN) settings for the VDSL port. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Copy | Do the following to copy DSL settings from one DSL port to another DSL port or ports.<br>1. Use the **Slot** and **Port** drop-down list boxes and the **Load** button to select the number of the DSL port from which you want to copy settings.<br>2. Click **Copy** to open the following screen.<br>**Figure 101** Copy<br>  <br><br>3. Select a line card to which you want to copy settings.<br>4. Select the check boxes of the DSL ports on the line card to which you want to copy the settings. Click **Select All** to mark all of the port check boxes or click **Select None** to clear all of the port check boxes.<br>5. Click **Apply** to copy the settings to all of the ports that you have selected in this screen. Click **Cancel** to close the screen without saving changes. |
| ID | This column lists the slot numbers of the line cards. Click the ID number of an active DSL line card to go to a screen where you can copy an DSL port's settings to another DSL port. |

**Table 74** VDSL Port Setup (continued)

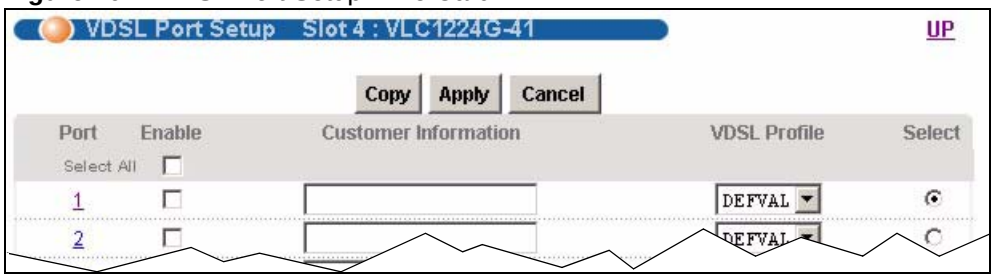
| LABEL | DESCRIPTION |
|---|---|
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

A. Band plan 997 is not supported at the time of writing.

## 11.8.1 VDSL Port Setup Line Card Screen

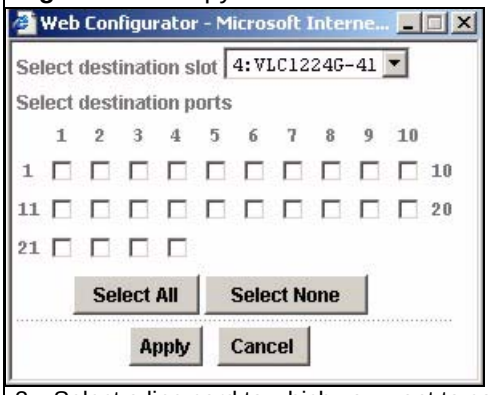
Click **Port** > **VDSL** in the navigation panel to open the **VDSL Port Setup** screen. Click the slot number of an active VDSL line card to open the following screen. Use this screen to configure settings for individual VDSL ports and copy settings between ports.

**Figure 102** VDSL Port Setup: Line Card



The following table describes the fields in this screen.

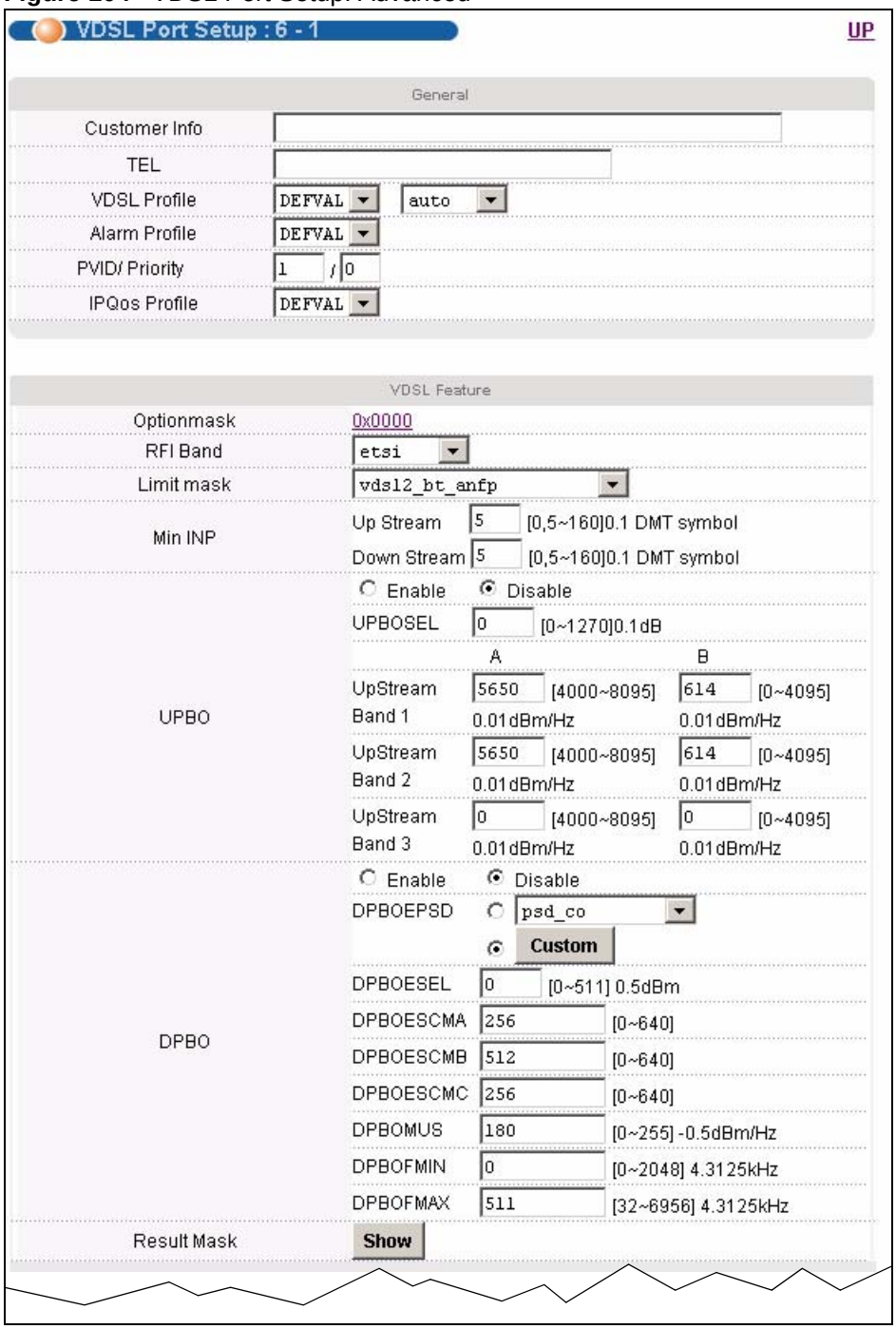
**Table 75** VDSL Port Setup: Line Card

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| Copy | Do the following to copy settings from one DSL port to another DSL port or ports.<br>1. Use the **Select** column to choose a DSL port from which you want to copy settings.<br>2. Click **Copy** to display the following screen.<br><br>**Figure 103** Copy<br>  <br><br>3. Select a line card to which you want to copy settings.<br>4. Select the check boxes of the DSL ports on the line card to which you want to copy the settings. Click **Select All** to mark all of the port check boxes or click **Select None** to clear all of the port check boxes.<br>5. Click **Apply** to copy the settings to all of the ports that you have selected in this screen. Click **Cancel** to close the screen without saving changes. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Port | These are the numbers of the DSL ports on the line card.<br>To configure advanced port settings, click a port number to display the **VDSL Port Setup** screen. |
| Enable | Select a check box in this column to turn on a port. Select the check box at the top of the column to turn on all of the line card's ports. |
| Customer Information | Enter information to identify the subscriber connected to this VDSL port. You can use up to 31 printable English keyboard characters (including spaces and hyphens). |
| VDSL Profile | Select a profile of VDSL settings (such as the transfer rate, interleave delay and signal to noise ratio settings) to assign to this port. Use the **VDSL Profile** screen to configure VDSL port profiles. |
| Select | Use the **Select** column to choose a DSL port from which you want to copy settings. |

## 11.8.2 VDSL Port Setup Advanced

Click **Port** > **VDSL** in the navigation panel to open the **VDSL Port Setup** screen. Click the slot number of an active VDSL line card and click a port number to display the configuration screen. Use this screen to configure an VDSL port's detailed settings.

**Figure 104** VDSL Port Setup: Advanced




The following table describes the fields in this screen.

**Table 76** VDSL Port Setup: Advanced

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| Customer Info | Enter information to identify the subscriber connected to this VDSL port. You can use up to 31 printable English keyboard characters (including spaces and hyphens). |

**Table 76** VDSL Port Setup: Advanced

| LABEL | DESCRIPTION |
|---|---|
| TEL | Enter information to identify the telephone number of the subscriber connected to this VDSL port. You can use up to 15 English keyboard characters (including spaces and hyphens). |
| VDSL Profile | Select a VDSL line profile to assign to this port in the first drop-down list box. Use the **VDSL Profile** screen to configure VDSL port profiles.<br>Select a profile defined by the VDSL standard from the second drop-down list box. Select **auto** to automatically detect the protocol used on the connected line. Select **adsl2** or **adsl2+** to specify the only protocol that can be used on this port. Refer to Table 11.2.4 on page 182 for information on other VDSL2 profiles used in this screen. |
| Alarm Profile | Select an alarm profile to define the thresholds that trigger an alarm on the port when exceeded. |
| PVID/ Priority | Specify the default VLAN ID (1~4094) and IEEE 802.1p priority (0~7) to add to untagged frames received on this port.<br>If an untagged frame matches a PVLAN setting, the system uses the PVLAN setting instead.<br>Tagged frames are handled according to the VDSL line card's VLAN setup. |
| IPQoS Profile | Select a QoS (Quality of Service) profile from the drop-down box to classify and prioritize application traffic. Use the **Profile** > **IPQoS** screen to configure IPQoS profiles. |
| VDSL Feature | |
| Optionmask | This field displays the bit mask that represents the features that have been disabled for this connection. Click the bit mask number to open the Option Mask screen where you can disable attributes for the port. This is for advanced troubleshooting. |
| RFI Band | RFI is induced noise on the lines by surrounding radio sources such as AM and HAM radio stations. To avoid performance degradation due to RFI, set the switch to not transmit VDSL signals in the RFI band plans defined by the regulatory bodies. You can also configure your own RFI band plans on the system.<br>Select **ansi** to use the RFI band plan settings defined by ANSI.<br>Select **etsi** to use the RFI band plan settings defined by ETSI.<br>Select **Disable** to deactivate this function.<br>Select **Custom** to configure RFI settings in the fields below. |
| Limit Mask | To reduce the impact of interference and attenuation, ITU-T 993.2 specifies a PSD mask to limit the Power Spectral Density at both downstream and upstream. Select the correct PSD mask for your region and line conditions. Selecting multiple PSD masks for a single DSL line or line bundle may increase interference.<br>See Table 78 on page 206 for a list of Limit Mask profiles available in this screen. |
| Min INP | Sudden spikes in the line's noise level (external noise) can cause errors and result in lost packets. Set the impulse noise protection minimum to have a buffer to protect the ADSL physical layer against impulse noise. This buffering causes a delay that reduces transfer speeds. It is recommended you use a non-zero setting for real-time traffic that has no error correction (such as video-conferencing).<br>Type DMT (Discrete Multi-Tone) values in the **Up Stream** and **Down Stream** fields provided to specify the level of impulse noise (burst) protection (INP) for a slow (or interleaved) channel.<br>INP is defined in this screen as a multiple (between 0.5~160) of 0.1 DMT symbols. The number of DMT symbols specifies the time in which errors can be completely corrected. A higher symbol value provides higher error correction capability, but it causes overhead and higher delay which may increase error rates in received multimedia data. |

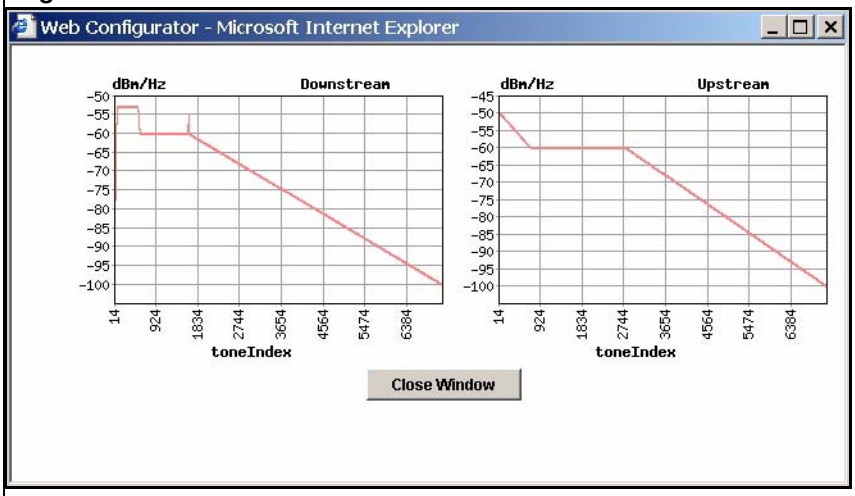
**Table 76** VDSL Port Setup: Advanced

| LABEL | DESCRIPTION |
|---|---|
| UPBO | UPBO (Upstream Power Back Off) allows the switch to provide better service in a network environment with telephone wiring of varying lengths.<br>Select **Enable** to activate this feature.<br>Select **Disable** to deactivate this feature.<br>Type the **UPBOSEL** (Upstream Power Back-off Exchange-Side Electrical Length) to specify the electrical length of the cable between CPE and CO.<br>Set this to other than 0 (1~127, in 0.1 dB) to force CPE devices to use the Device's electrical length value for UPBO adjustment. Set this to 0 to use a dynamic electrical length based on the result of the negotiation between the Device and CPE devices.<br>For Bands 1~3 specify 4000~8095 (0.01 dBm/Hz) for parameter **A** which defines the original band shape. Specify 0~4095 (0.01 dBm/Hz) for parameter **B** which defines the power back-off degree. Parameter **A** and **B** are used for UPBO PSD mask calculations. |

**Table 76** VDSL Port Setup: Advanced

| LABEL | DESCRIPTION |
|---|---|
| DPBO | DPBO (Downstream Power Back Off) allows the switch to provide better service in a network environment with telephone wiring of varying lengths.<br>Select **Enable** to avoid interference with other services (such as ISDN, ADSL or ADSL2 provided by other devices) on the same bundle of lines. ISDN in Europe uses a frequency range of up to 80 kHz, while ISDN in Japan uses a frequency range of up to 640 kHz. ADSL utilizes the 1.1 MHz band. Both ADSL2 and ADSL 2+ utilize the 2.2 MHz band.<br>Select **Disable** to deactivate this feature.<br>**DPBOEPSD** (Downstream Power Back Off assumed Exchange PSD Mask) is a pre-defined PSD mask to reduce interference with other services (for example, ADSL) in the same copper bundle.<br>**psd_co**: Select this if the Device is deployed at the CO and you want it to use the full ADSL band.<br>**psd_flat**: Select this to have the Device not use the ADSL band.<br>**psd_cab_ansi**: Select this if the Device is deployed in a cabinet and has to co-exist with other services in region A.<br>**psd_cab_etsi**: Select this if the Device is deployed in a cabinet and has to co-exist with other services in region B.<br>**psd_exch_etsi**: Select this if the Device is deployed in an exchange and has to co-exist with other services in region B.<br>**psd_exch_ansi**: Select this if the Device is deployed in an exchange and has to co-exist with other services in region A.<br>Click **Custom** to display a screen where you can customize breakpoints and PSD level for the PSD mask. See Section 11.8.5 on page 208.<br><br>**DPBOESEL**: This is the electrical length of the cable between the CO and Cabinet. Type the electrical length in multiples between 0~511 of 0.5 dBm. See Section 11.2.9 on page 184 for an explanation of electrical length.<br>**DPBOESCMA, DPBOESCMB, DPBOESCMC:** These are parameters in a cable model that is used to describe signal loss at an insertion point of a DSL line (such as a cabinet) on a bundled DSL connection between the CO and CPE.<br>**DPBOMUS:** This is the assumed minimum usable PSD mask of exchange signals at remote site (in dBm/Hz), used to modify parameter DPBOFMAX defined below.<br>**DPBOFMIN**: This is the minimum frequency at which DPBO may be applied.<br>**DPBOFMAX**: This is the maximum frequency at which DPBO may be applied.<br><br>Note: For more information on these values, see the ITU G. 993.2 specifications. |

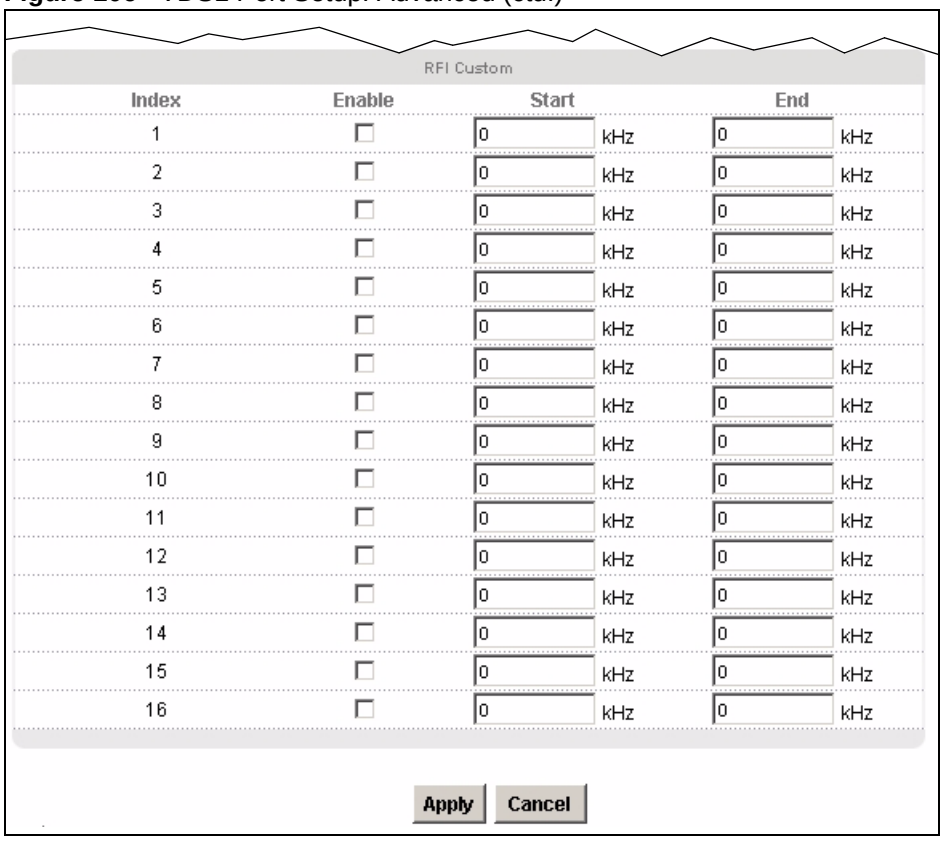
**Table 76** VDSL Port Setup: Advanced

| LABEL | DESCRIPTION |
|---|---|
| Result Mask | Click **Show** to display the upstream and downstream result mask. Use this screen to check PSD mask settings.<br><br>**Figure 105** Result Mask<br>  <br><br>Click **Close Window** to close this window. |

## 11.8.3 The VDSL Port Setup Screen (ctd.)

Use this section of the screen to configure custom RFI settings.

**Figure 106** VDSL Port Setup: Advanced (ctd.)




The following table describes the fields in this screen.

**Table 77** VDSL Port Setup: Advanced

| LABEL | DESCRIPTION |
|---|---|
| Index | This field displays the index number. |
| Enable | Select **Enable** to activate the RFI band. |
| Start | Enter the start of the frequency range in kilohertz (kHz). |
| End | Enter the end of the frequency range in kHz. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the fields again. |

#### 11.8.3.1 Limit Mask Profiles

The following section describes the limit mask profiles supported by your Device. Select a limit mask profile for use on your DSL line or line bundle. To minimize interference between PSDs assign a single Limit Mask profile to a DSL line or line bundle.

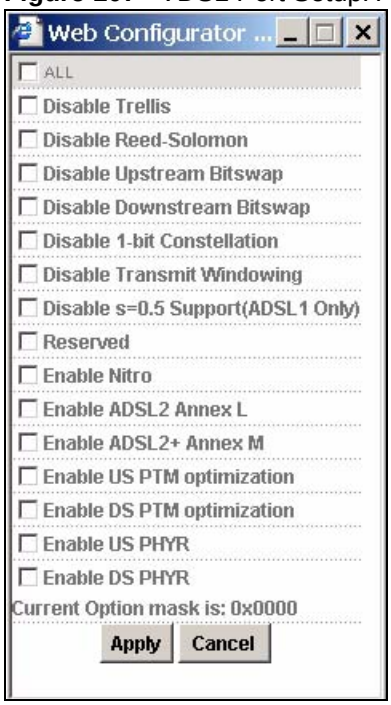
**Table 78** VDSL2 Limit Mask profiles

| ANNEX A | VDSL1 (FOR BACKWARDS COMPATIBILITY) | ANNEX B | ANNEX C |
|---|---|---|---|
| **vdsl12_a_nus0** | **vdsl1_fttex_ansi_m1** | **vdsl12_a_ct** | **vdsl12_bt_anfp** (BT only) |
| **vdsl12_a_eu23** | **vdsl1_fttex_ansi_m2** | **vdsl12_b8_1** | **vdsl12_c_138_b** |
| **vdsl12_a_eu36** | **vdsl1_fttcab_ansi_m1** | **vdsl12_b8_2** | **vdsl12_c_276_b** |
| **vdsl12_a_eu40** | **vdsl1_fttcab_ansi_m2** | **vdsl12_b8_3** | **vdsl12_c_138_co** |
| **vdsl12_a_eu44** | **vdsl1_fttex_ansi_m1_e** | **vdsl12_b8_4** | **vdsl12_c_276_co** |
| **vdsl12_a_eu48** | **vdsl1_fttex_ansi_m1_e** | **vdsl12_b8_5** | |
| **vdsl12_a_eu52** | **vdsl1_fttcab_ansi_m1_e** | **vdsl12_b8_6** | |
| **vdsl12_a_eu56** | **vdsl1_fttcab_ansi_m2_e** | **vdsl12_b8_7** | |
| **vdsl12_a_eu60** | | **vdsl12_b8_8** | |
| **vdsl12_a_eu64** | | **vdsl12_b8_9** | |
| **vdsl12_a_eu128** | | **vdsl12_b8_10** | |
| | | **vdsl12_b8_11** | |
| | | **vdsl12_b8_12** | |
| | | **vdsl12_b8_13** | |
| | | **vdsl12_b8_14** | |
| | | **vdsl12_b8_15** | |
| | | **vdsl12_b8_16** | |
| | | **vdsl12_b7_1** | |
| | | **vdsl12_b7_2** | |
| | | **vdsl12_b7_3** | |
| | | **vdsl12_b7_4** | |
| | | **vdsl12_b7_5** | |
| | | **vdsl12_b7_6** | |
| | | **vdsl12_b7_7** | |
| | | **vdsl12_b7_8** | |
| | | **vdsl12_b7_9** | |
| | | **vdsl12_b7_10** | |
| | | **vdsl12_b7_7** | |

## 11.8.4 VDSL Optionmask Screen

Click the **Optionmask** link in the advanced **VDSL Port Setup** screen to display a pop-up screen as shown. Use this screen to enable features on a port for advanced troubleshooting. ADSL features are included because the VDSL line card supports ADSL fallback.

**Figure 107** VDSL Port Setup: Advanced: Optionmask




The following table describes the fields in this screen.

**Table 79** VDSL Port Setup: Advanced: Optionmask

| LABEL | DESCRIPTION |
|---|---|
| All | Use the check boxes to disable individual features. Use the **All** check box to select every feature check box. |
| Disable Trellis | Trellis encoding helps to reduce the noise in ADSL transmissions. Trellis may reduce throughput but it makes the connection more stable. |
| Disable Reed Solomon | Reed-Solomon performs transmission error correction. |
| Disable Upstream/ Downstream Bitswap | Bit swapping allows the system to respond to noise on a tone by sending data on another tone. The subscriber (ATU-R) equipment must also support bit swapping in order for this feature to work. |
| Disable 1-bit Constellation | 1-bit constellation allows the system to send individual bits over DMT tones that can only support one bit. This allows the connection to use as many of the tones as possible. |
| Disable Transmit Windowing | Transmit windowing is only available with ADSL2+. |
| Disable S=0.5 Support(ADSL1 Only) | 0.5 support maps two Reed-Solomon code words into one data frame (instead of one) to increase the maximum G.dmt transmission rate. |
| Reserved | At the time of writing, this feature is not available. |
| Enable Nitro | This allows ATM header compression for greater bandwidth efficiency. |
| Enable ADSL2 Annex L | Annex L allows transmission at a greater distance. However, it may increase interference at lower frequencies, due to the higher power used in this range. |
| Enable ADSL2+ Annex M | Annex M allows faster upload rates. |

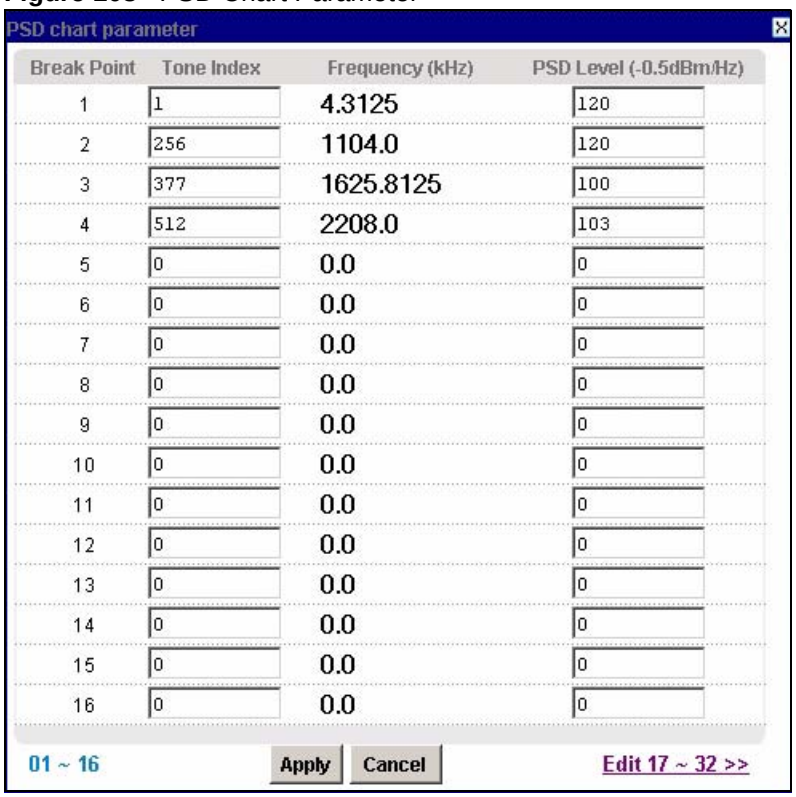
**Table 79** VDSL Port Setup: Advanced: Optionmask (continued)

| LABEL | DESCRIPTION |
|---|---|
| Enable US PTM optimization | Select this to enable upstream packet transfer mode (PTM). This boosts performance by improving the payload passthrough rate. To use this feature a CPE device which supports this feature is required. |
| Enable DS PTM optimization | Select this to enable downstream packet transfer mode (PTM). This boosts performance by improving the payload passthrough rate. To use this feature a CPE device which supports this feature is required. |
| Enable US PHYR | Select this feature to enable physical layer protection on upstream traffic. This feature has the same function as INP (Impulse Noise Protection) but is more effective. |
| Enable DS PHYR | Select this feature to enable physical layer protection on downstream traffic. This feature has the same function as INP (Impulse Noise Protection) but is more effective. |
| Current Option mask is: | Selecting or clearing feature check boxes adjusts the current option mask displayed at the bottom of the screen. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to close the screen without saving your changes. |

## 11.8.5 The PSD Chart Parameter Screen

Click the **Custom** button in the **Port > VDSL** screen. A **PSD chart parameter** screen appears. Use this screen to customize the relationship between frequency and PSD level for a PSD mask.

**Figure 108** PSD Chart Parameter




The following table describes the labels in this screen.

**Table 80** ADSL Port Setup: Advanced: Option Mask

| LABEL | DESCRIPTION |
|---|---|
| Break Point | This index number identifies each incremental break point. There are 32 break points in total you can configure. Click the **Edit 17 ~ 32 >>** link to configure the 17th to 32nd settings. |
| Tone Index | The frequency range used in VDSL transmission is divided into sub-carriers or tones. Each tone has a range of 4.3125 kHz.<br>Enter a value from 0 to 4096 in this field to select a tone. Each **Tone Index** value must be higher than that entered in the previous row. |
| Frequency (kHz) | This read-only field displays the frequency equal to the tone index multiplied by 4.3125 dBm/Hz. This field is automatically updated based on the corresponding **Tone Index** value entered. |
| PSD Level (-0.5dBm/Hz) | Enter the PSD level in -0.5 dBm/Hz to map to a certain frequency. |
| Apply | Click **Apply** to save your changes back to the Device. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

## 11.8.6 Transparent LAN Service (TLS)

Transparent LAN Service (also known as VLAN stacking or Q-in-Q) allows a service provider to distinguish multiple customers VLANs, even those with the same (customer-assigned) VLAN ID, within its network.

Use TLS to add an outer VLAN tag to the inner IEEE 802.1Q tagged frames that enter the network. By tagging the tagged frames (“double-tagged” frames), the service provider can manage up to 4,094 VLAN groups with each group containing up to 4,094 customer VLANs. This allows a service provider to provide different services, based on specific VLANs, for many different customers.

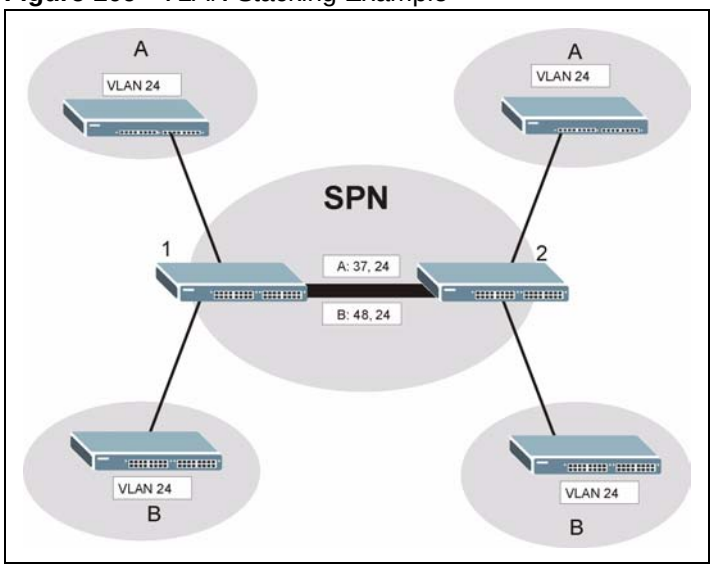
A service provider’s customers may require a range of VLANs to handle multiple applications. A service provider’s customers can assign their own inner VLAN tags to traffic. The service provider can assign an outer VLAN tag for each customer. Therefore, there is no VLAN tag overlap among customers, so traffic from different customers is kept separate.

Before the switch sends the frames from the customers, the VLAN ID is added to the frames. When packets intended for specific customers are received on the MSC1000G, the outer VLAN tag is removed before the traffic is sent.

## 11.8.7 TLS Network Example

In the following example figure, both A and B are Service Provider’s Network (SPN) customers with VPN tunnels between their head offices and branch offices respectively. Both have an identical VLAN tag for their VLAN group. The service provider can separate these two VLANs within its network by adding tag 37 to distinguish customer A and tag 48 to distinguish customer B at edge device 1 and then stripping those tags at edge device 2 as the data frames leave the network.

**Figure 109** VLAN Stacking Example




### 11.8.7.1 VLAN Tag Format

A VLAN tag (service provider VLAN stacking or customer IEEE 802.1Q) consists of the following three fields.

**Table 81** VLAN Tag Format

| | | |
|---|---|---|
| Type | Priority | VID |

**Type** is a standard Ethernet type code identifying the frame and indicates that whether the frame carries IEEE 802.1Q tag information. **SP TPID** (Service Provider Tag Protocol Identifier) is the service provider VLAN stacking tag type. The system use 0x8100.

**TPID** (Tag Protocol Identifier) is the customer IEEE 802.1Q tag.

**Priority** refers to the IEEE 802.1p standard that allows the service provider to prioritize traffic based on the class of service (CoS) the customer has paid for.

- On the switch, configure the priority level of the inner IEEE 802.1Q tag in the **Port Setup** screen.
- "0" is the lowest priority level and "7" is the highest.

**VID** is the VLAN ID. **SP VID** is the VID for the second (service provider's) VLAN tag.

#### 11.8.7.2 Frame Format

The frame format for an untagged Ethernet frame, a single-tagged 802.1Q frame (customer) and a "double-tagged" 802.1Q frame (service provider) is shown next.

Configure the fields as circled in the switch **VLAN Stacking** screen.

**Table 82** Single and Double Tagged 802.1Q Frame Format

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | DA | SA | Len/ Etype | Data | FCS | **Untagged Ethernet frame** |
| | | | DA | SA | **TPID** | **Priority** | **VID** | Len/ Etype | Data | FCS | **IEEE 802.1Q customer tagged frame** |
| DA | SA | **SPTPID** | **Priority** | **VID** | **TPID** | **Priority** | **VID** | Len/ Etype | Data | FCS | **Double-tagged frame** |

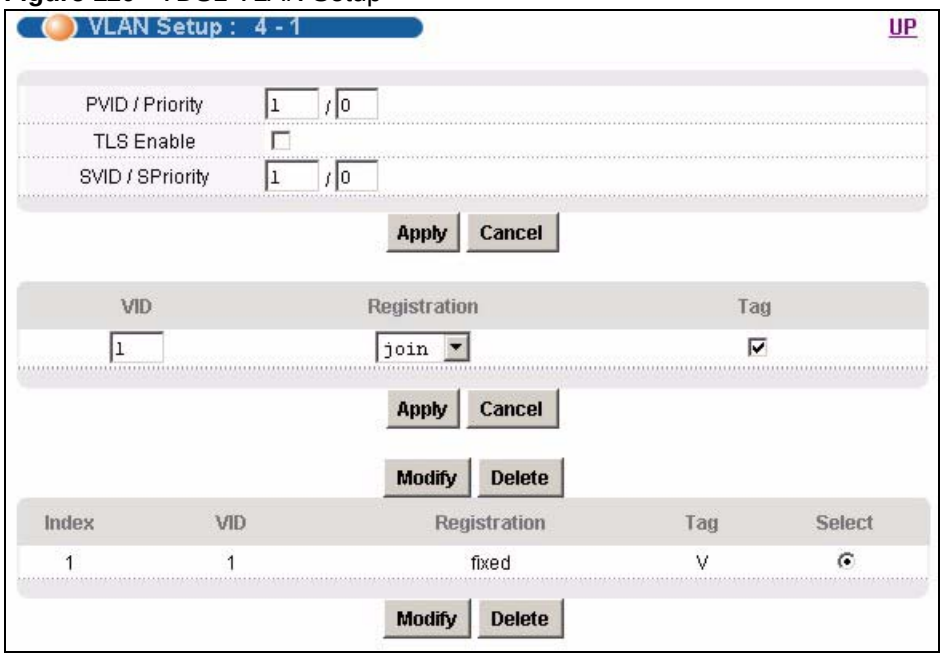
**Table 83** 802.1Q Frame

| | | | |
|---|---|---|---|
| DA | Destination Address | Priority | 802.1p Priority |
| SA | Source Address | Len/ Etype | Length and type of Ethernet frame |
| (SP)TPID | (Service Provider) Tag Protocol IDentifier | Data | Frame data |
| VID | VLAN ID | FCS | Frame Check Sequence |

## 11.8.8 VDSL VLAN Setup

Click **Port > VDSL** in the navigation panel to open the **VDSL Port Setup** screen. Select a VDSL line card ID, a port index number and click **Setup** next to **VLAN** to open the following screen. Use this screen to add the VDSL port to VLANs (or remove it from VLANs) and configure the TLS (Transparent LAN Service) settings.

**Figure 110** VDSL VLAN Setup




The following table describes the fields in this screen.

**Table 84** VDSL Port Setup: VLAN Setup

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| PVID / Priority | PVID refers to the customer's VLAN ID. In the first field, enter the VLAN ID (from 1 to 4094) to use for untagged frames received on this port.<br>In the second field, enter the priority level for the customer VLAN ID. "0" is the lowest priority level and "7" is the highest. |
| TLS Enable | Transparent LAN Service (also known as VLAN stacking or Q-in-Q) allows a service provider to distinguish multiple customers VLANs, even those with the same (customer-assigned) VLAN ID, within its network.<br>Once you enable TLS, all packets will be added an extra "VLAN tag" (SPVID/ SPriority) and forwarded toward Gigabit Ethernet interface(s).<br>Select this option to enable TLS (Transparent LAN Service). Clear this check box to disable this feature. Refer to Section 29.28 on page 576 for more information. |
| SVID / SPriority | SPVID refers to the service provider's VLAN ID (the outer VLAN tag). In the first field, enter the service provider ID (from 1 to 4094) for frames received on this port.<br>In the second field, enter the priority level for the service provider's VLAN ID. "0" is the lowest priority level and "7" is the highest. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| VID | Type a VID (VLAN ID) to add this port as a member.<br>This must be the VLAN ID of a VLAN that is already configured. The port that you are configuring must also be set to the fixed status in the VLAN. |
| Registration | Select **join** to have the port be a member of the specified VLAN.<br>Select **leave** to remove the port from the specified VLAN. |

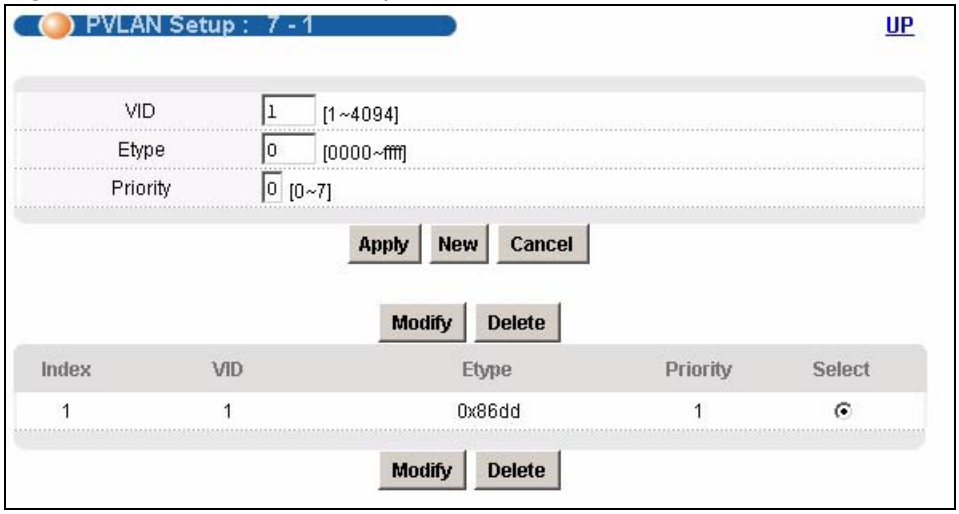
**Table 84** VDSL Port Setup: VLAN Setup (continued)

| LABEL | DESCRIPTION |
|---|---|
| Tag | Select the check box to tag all frames transmitted on this port with the port's VID. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| The table in the bottom half of the screen lists the VLANs that the port is a member of. | |
| Modify | Click **Modify** to display the selected VLAN membership entry's settings in the fields above so you can edit them. |
| Delete | Click **Delete** to remove the selected VLAN membership entry. |
| Index | This is the number of the VLAN membership entry. |
| VID | This field displays the number of a VLAN (VLAN ID) of which this port is a member. |
| Registration | This field displays "fixed" to indicate that the port is a member of the specified VLAN. |
| Tag | This field displays "V" if the line card is to tag all frames that are transmitted out on this port with this VLAN group ID. It displays "-" if the line card does not tag all frames that are transmitted out on this port with this VLAN group ID. |
| Select | Select the radio button of a VLAN membership entry and then use the **Modify** button or the **Delete** button. |

## 11.8.9 VDSL PVLAN Setup

Click **Port** > **VDSL** in the navigation panel to open the **VDSL Port Setup** screen. Select a VDSL line card ID, a port index number and click **Setup** (next to **PVLAN**) to open the following screen. (Not all VDSL line cards support PVLAN.) Use this screen to configure Protocol VLAN (PVLAN) settings for the VDSL port. PVLAN adds a VLAN ID and IEEE 802.1p priority to a specific protocol's untagged traffic.

**Figure 111** VDSL PVLAN Setup



The following table describes the fields in this screen.

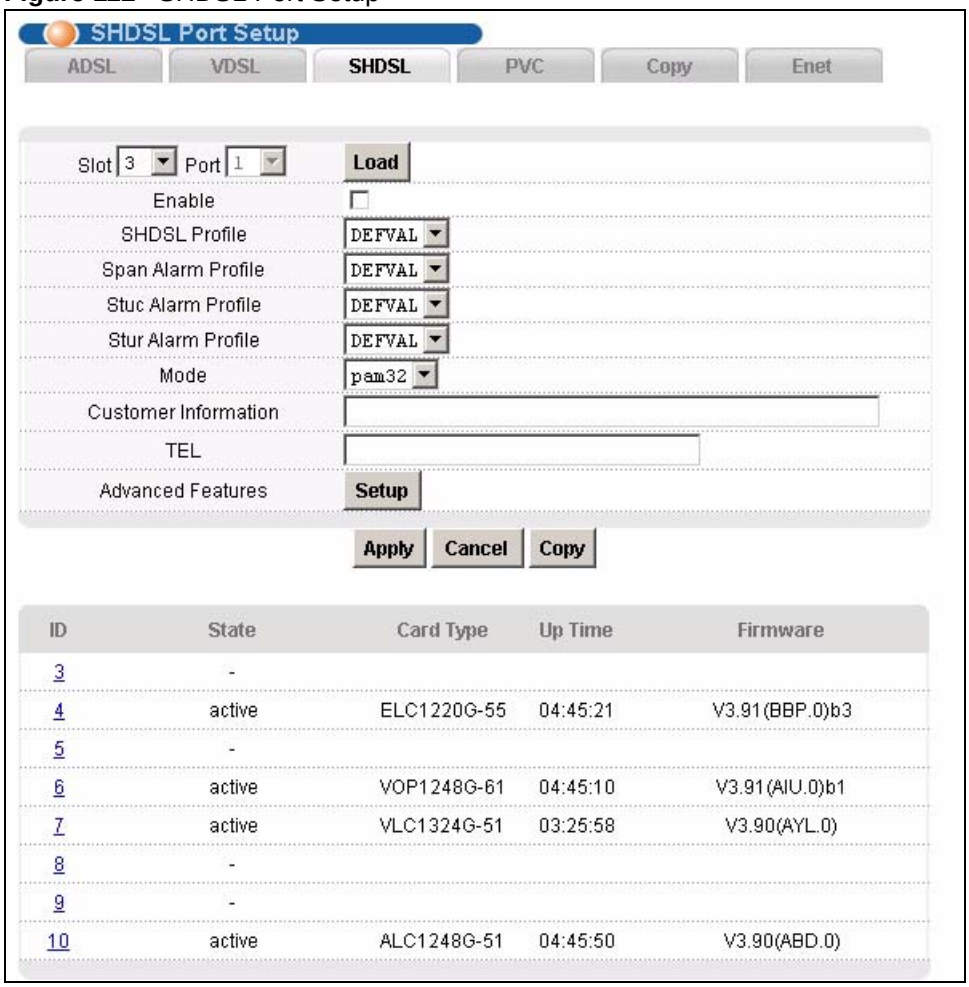
**Table 85** VDSL Port Setup: PVLAN Setup

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| VID | Enter the VLAN ID (from 1 to 4094) of the VLAN to add to untagged frames of the protocol specified in this PVLAN configuration. |
| Etype | Enter the four hexadecimal digits that specify the Ethernet type of a specific protocol. For example, 0806 is the Ethernet type, 0x0806, for ARP (Address Resolution Protocol) traffic. The system checks for untagged frames with this Ethernet type and adds the configured VID and priority. |
| Priority | Enter the IEEE 802.1p priority (0 to 7) to add to untagged frames of the protocol specified in this PVLAN configuration. "0" is the lowest priority level and "7" is the highest. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | Click **New** to set the screen to configure a new entry. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| The table in the bottom half of the screen lists the PVLANs that the port is a member of. | |
| Modify | Click **Modify** to display the selected PVLAN membership entry's settings in the fields above so you can edit them. |
| Delete | Click **Delete** to remove the selected PVLAN membership entry. |
| Index | This is the number of the PVLAN membership entry. |
| VID | This field displays the number of a VLAN (VLAN ID) to add to untagged frames of the specified protocol. |
| Etype | This field displays the Ethernet type in hexadecimal. |
| Priority | This field displays the IEEE 802.1p priority to add to untagged frames of the specified protocol. |
| Select | Select the radio button of a PVLAN membership entry and then use the **Modify** button or the **Delete** button. |

## 11.9 SHDSL Port Setup

Click **Port > SHDSL** in the navigation panel to open the following screen. Use this screen to configure settings for individual SHDSL ports.

**Figure 112** SHDSL Port Setup




The following table describes the fields in this screen.

**Table 86** SHDSL Port Setup

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the number of a line card's slot. |
| Port | Select the number of a DSL port on the line card. |
| Load | Click **Load** to display the port's settings in the fields below. |
| Enable | Select this check box to turn on this port. |
| SHDSL Profile | Select a profile of SHDSL settings (such as the transfer rate, wire pair and signal to noise ratio settings) to assign to this port. Use the **SHDSL Profile** screen to configure SHDSL port profiles. |
| Span Alarm Profile | Select an alarm profile to define the thresholds that trigger an alarm on the port when exceeded. This alarm profile is for the whole span. This is the entire connection including any SHDSL regenerators that might be located between the STU-C (SHDSL Termination Unit - Central) and STU-R (SHDSL Termination Unit - Remote) end points. An SHDSL regenerator amplifies the SHDSL signal in order to increase the connection distance. |
| Stuc Alarm Profile | Select an alarm profile to define the thresholds that trigger an alarm on the port when exceeded. This alarm profile is for the STU-C (SHDSL Termination Unit - Central) end point. |

**Table 86** SHDSL Port Setup (continued)

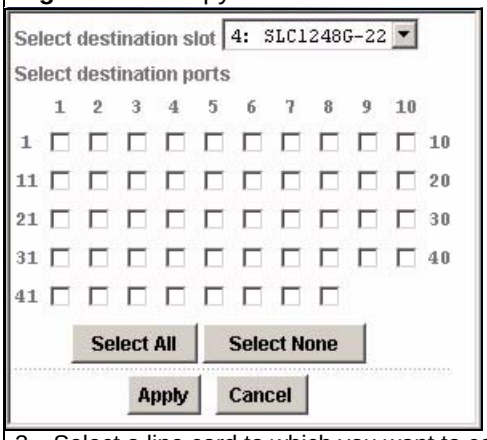
| LABEL | DESCRIPTION |
|---|---|
| Stur Alarm Profile | Select an alarm profile to define the thresholds that trigger an alarm on the port when exceeded. This alarm profile is for the STU-R (SHDSL Termination Unit - Remote) end point. |
| Mode | |
| Customer Information | Enter information to identify the subscriber connected to this DSL port. You can use up to 31 printable English keyboard characters (including spaces and hyphens). |
| TEL | Enter information to identify the telephone number of the subscriber connected to this DSL port. You can use up to 15 English keyboard characters (including spaces and hyphens). |
| Advanced Features | Click the **Setup** button to open a screen where you can configure the SHDSL port's detailed settings. |
| Apply | Click **Apply** to have the specified DSL port use the selected IGMP filter profile. |
| Cancel | Click **Cancel** to set the fields back to the settings that you last retrieved. |
| Copy | Do the following to copy DSL settings from one DSL port to another DSL port or ports.<br>1. Use the **Slot** and **Port** drop-down list boxes and the **Load** button to select the number of the DSL port from which you want to copy settings.<br>2. Click **Copy** to open the following screen.<br>**Figure 113** Copy<br>  <br>3. Select a line card to which you want to copy settings.<br>4. Select the check boxes of the DSL ports on the line card to which you want to copy the settings. Click **Select All** to mark all of the port check boxes or click **Select None** to clear all of the port check boxes.<br>5. Click **Apply** to copy the settings to all of the ports that you have selected in this screen. Click **Cancel** to close the screen without saving changes. |
| ID | This column lists the slot numbers of the line cards. Click the ID number of an active SHDSL line card to go to a screen where you can copy an SHDSL port's settings to another SHDSL port. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |

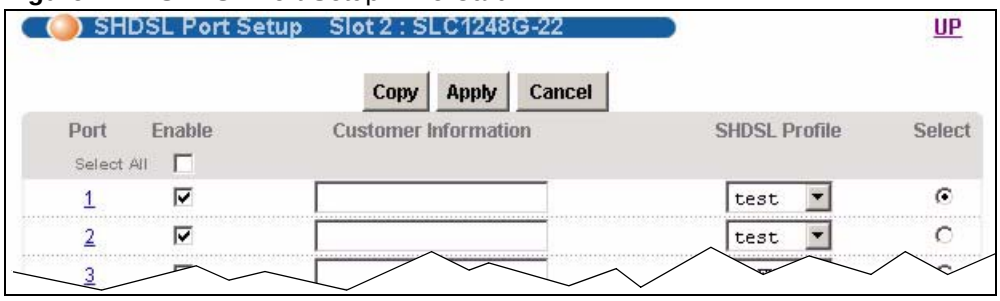
**Table 86** SHDSL Port Setup (continued)

| LABEL | DESCRIPTION |
|---|---|
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 11.9.1 SHDSL Port Setup Line Card Screen

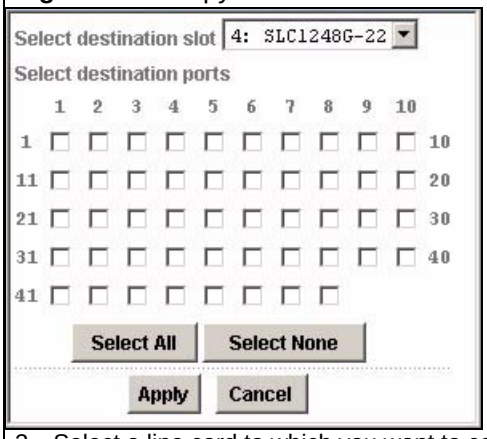
Click **Port** > **SHDSL** in the navigation panel to open the **SHDSL Port Setup** screen. Click the slot number of an active SHDSL line card to open the following screen. Use this screen to configure settings for individual SHDSL ports and copy settings between ports.

**Figure 114** SHDSL Port Setup: Line Card



The following table describes the fields in this screen.

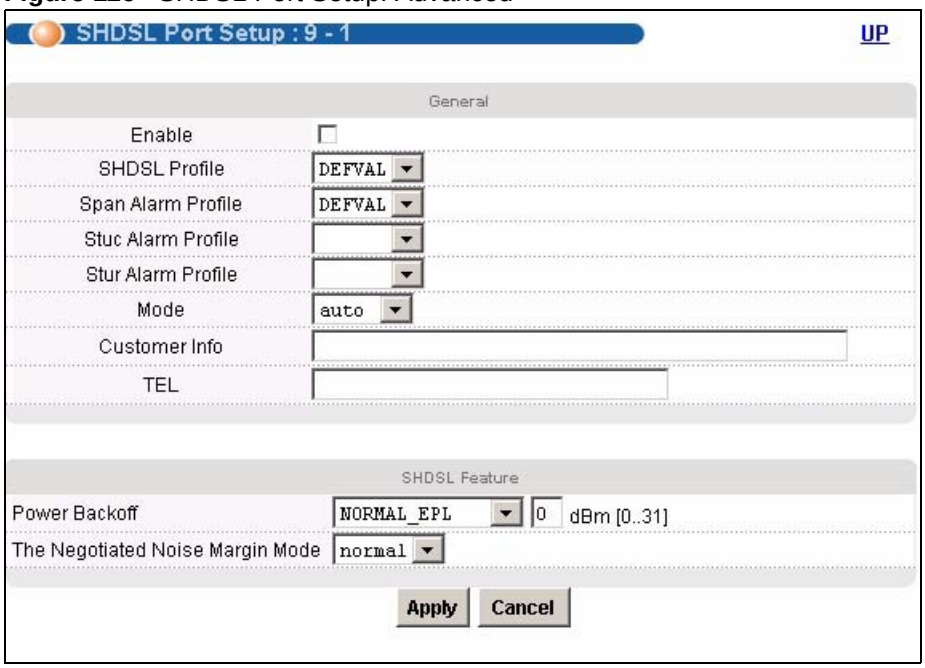
**Table 87** SHDSL Port Setup: Line Card

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| Copy | Do the following to copy settings from one DSL port to another DSL port or ports.<br>1. Use the **Select** column to choose a DSL port from which you want to copy settings.<br>2. Click **Copy** to open the following screen.<br><br>**Figure 115** Copy<br>  <br><br>3. Select a line card to which you want to copy settings.<br>4. Select the check boxes of the DSL ports on the line card to which you want to copy the settings. Click **Select All** to mark all of the port check boxes or click **Select None** to clear all of the port check boxes.<br>5. Click **Apply** to copy the settings to all of the ports that you have selected in this screen. Click **Cancel** to close the screen without saving changes. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Port | These are the numbers of the DSL ports on the line card. |
| Enable | Select a check box in this column to turn on a port. Select the check box at the top of the column to turn on all of the line card's ports. |
| Customer Information | Enter information to identify the subscriber connected to this DSL port. You can use up to 31 printable English keyboard characters (including spaces and hyphens). |
| SHDSL Profile | Select a profile of SHDSL settings (such as the transfer rate, wire pair and signal to noise ratio settings) to assign to this port. Use the **SHDSL Profile** screen to configure SHDSL port profiles.<br><br>Note: You must apply the same profile on the two SHDSL ports connecting to the same subscriber device. |
| Select | Use the **Select** column to choose a DSL port from which you want to copy settings. |

## 11.9.2 SHDSL Port Setup Advanced

Click **Port** > **SHDSL** in the navigation panel to open the **SHDSL Port Setup** screen. Click the **Setup** button to open the following screen. Use this screen to configure an SHDSL port's detailed settings.

**Figure 116** SHDSL Port Setup: Advanced




The following table describes the fields in this screen.

**Table 88** SHDSL Port Setup: Advanced

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Enable | Select this check box to turn on this port. |
| SHDSL Profile | Select a profile of SHDSL settings (such as the transfer rate, wire pair and signal to noise ratio settings) to assign to this port. Use the **SHDSL Profile** screen to configure SHDSL port profiles. |
| Span Alarm Profile | Select an alarm profile to define the thresholds that trigger an alarm on the port when exceeded. This alarm profile is for the whole span. This is the entire connection including any SHDSL regenerators that might be located between the STU-C (SHDSL Termination Unit - Central) and STU-R (SHDSL Termination Unit - Remote) end points. An SHDSL regenerator amplifies the SHDSL signal in order to increase the connection distance. |
| Stuc Alarm Profile | Select an alarm profile to define the thresholds that trigger an alarm on the port when exceeded. This alarm profile is for the STU-C (SHDSL Termination Unit - Central) end point. |

**Table 88** SHDSL Port Setup: Advanced (continued)

| LABEL | DESCRIPTION |
|---|---|
| Stur Alarm Profile | Select an alarm profile to define the thresholds that trigger an alarm on the port when exceeded. This alarm profile is for the STU-R (SHDSL Termination Unit - Remote) end point. |
| Customer Info | Enter information to identify the subscriber connected to this ADSL port. You can use up to 31 printable English keyboard characters (including spaces and hyphens). |
| TEL | Enter information to identify the telephone number of the subscriber connected to this ADSL port. You can use up to 15 English keyboard characters (including spaces and hyphens). |
| SHDSL Feature | |
| Power Backoff | This command sets the power backoff feature setting on the SHDSL port. Power backoff calculates how much power is needed for the connection. This allows the STU-C and STU-R to use only enough power for the port's maximum transmission rate (configured in the SHDSL profile). You can normally just leave the default setting (**NORMAL_EPL**), you only need to use this command if the STU-R does not support EPL or you need to configure the port to use a specific power backoff setting.<br>Select **NORMAL_EPL** to use power backoff with EPL (Estimated Power Loss). Each end calculates an EPL and uses it in determining a power backoff value for the other end to use.<br>Select **FORCED_EPL** to use forced power backoff with EPL. The STU-C calculates an EPL and uses it in determining the power backoff values for both ends. This can be used when the STU-R device does not support EPL.<br>Select **FORCED_NO_EPL** to use forced power backoff without EPL. The STU-C uses the value you specify in determining the power backoff values for both ends. This can be used when you have prior knowledge about the physical line (loop).<br>Set the power backoff value (0~31 in dBm).<br>When using **NORMAL_EPL** or **FORCED_EPL**, this sets the maximum power backoff value.<br>When using **FORCED_NO_EPL**, this sets the power backoff value. |
| The Negotiated Noise Margin Mode | Specify how the target noise margin value is acquired.<br>Select **normal** to have each end of the connection determine the target noise margin to be used by the other end.<br>Select **forced** to set the upstream and downstream parameters according to the target noise margin value set in the SHDSL profile. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the fields again. |

## 11.10 Permanent Virtual Circuits

A Permanent Virtual Circuit (PVC) is a logical point-to-point circuit between sites. PVCs are low-delay circuits because routing decisions do not need to be made along the way. Permanent means that the circuit is pre-programmed by the carrier as a path through the network. It does not need to be set up or torn down for each session. PVCs are also called virtual channels.

The system can handle multiple IEEE 802.1p priority queues on a single PVC. You can also define up to eight PVCs on a DSL port and use them for different services or levels of service. You set the PVID that is assigned to untagged frames received on each channel. You also set an IEEE 802.1p priority for each of the PVIDs. In this way you can assign different priorities to different channels (and consequently the services that get carried on them or the subscribers that use them).

For example, you want to give high priority to voice service on one of the ADSL ports. First configure a static VLAN on the system for voice on the port. Then do the following:

- Configure a channel on the port for voice service.
- Set the channel to use the PVID of the static VLAN you configured.
- Assign the channel a high priority.

### 11.10.1 LLC

LLC is a type of encapsulation where one VC (Virtual Circuit) carries multiple protocols with each packet header containing protocol identifying information. Despite the extra bandwidth and processing overhead, this method may be advantageous if it is not practical to have a separate VC for each carried protocol, for example, if charging heavily depends on the number of simultaneous VCs.

### 11.10.2 VC Mux

VC Mux is a type of encapsulation where, by prior mutual agreement, each protocol is assigned to a specific virtual circuit, for example, VC1 carries IP, VC2 carries IPX, and so on. VC-based multiplexing may be dominant in environments where dynamic creation of large numbers of ATM VCs is fast and economical.

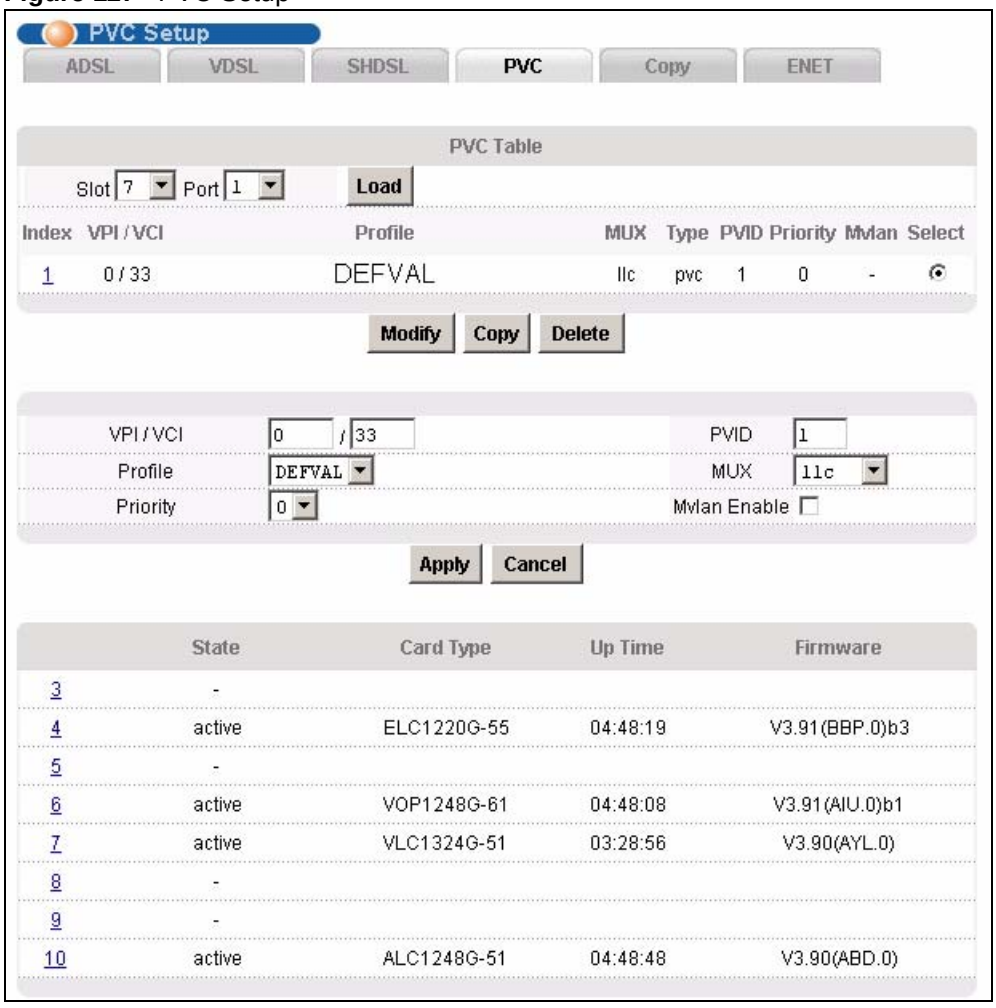
### 11.10.3 ATM Profiles

Asynchronous Transfer Mode (ATM) is a networking technology that provides high-speed data transfer. ATM uses fixed-size packets of information called cells. With ATM, a high QoS (Quality of Service) can be guaranteed. ATM profiles allow you to configure the virtual channels efficiently. You can configure all of the virtual channels with the same profile, thus removing the need to configure the virtual channels one-by-one. You can also change an individual virtual channel by assigning it a different profile. See the chapter on profiles for information on how to configure ATM profiles.

## 11.11 PVC Setup Screen

Click **Port > PVC** in the navigation panel to open the following screen. Use this screen to view and configure permanent virtual circuit settings for individual ports.

**Figure 117** PVC Setup




The following table describes the fields in this screen.

**Table 89** PVC Setup

| LABEL | DESCRIPTION |
|---|---|
| PVC Table | This table displays the PVCs that are configured for the selected port. |
| Slot | Select the number of a line card's slot. |
| Port | Select the number of a DSL port on the line card. |
| Load | Click **Load** to display the port's PVC settings in the **PVC Table**. |
| Index | This is the number of the PVC on this port. Click a number to open a screen where you can add the PVC to more VLANs (or remove it from VLANs). |
| VPI / VC | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI). The VPI and VCI identify a channel on this port. |
| Profile | This field displays the ATM profile that this channel uses. |
| MUX | This field displays the encapsulation type (**llc** or **vc**) for this channel. |
| Type | This field shows that the channel is a PVC. |
| PVID | This field displays the PVID (Port VLAN ID) to assign to untagged frames received on this channel. |

**Table 89** PVC Setup (continued)

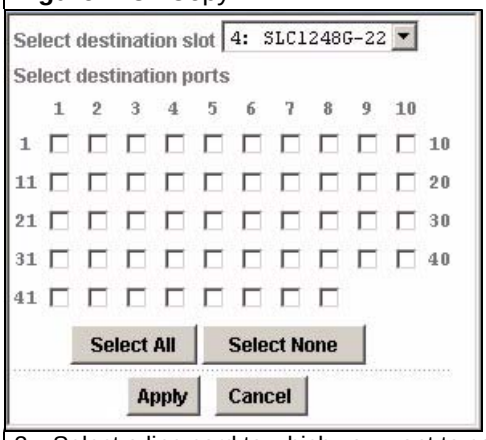
| LABEL | DESCRIPTION |
|---|---|
| Priority | This field displays the priority value (0 to 7) that the line card adds to frames that come in on this PVC without a (IEEE 802.1p) priority tag. |
| Mvlan | This field displays the PVC's current multicast VLAN setting. "-" indicates the multicast VLAN is not active while "V" indicates the multicast VLAN is active. |
| Select | Select a PVC's radio button and then use the **Modify**, **Copy** or **Delete** button. |
| Modify | Click **Modify** to display the selected PVC's settings in the fields above so you can edit them. |
| Copy | Do the following to copy VLAN and PVC settings from one DSL port to another DSL port or ports.<br>1. Use the **Select** column to choose a PVC which you want to copy to another port.<br>2. Click **Copy** to open the following screen.<br><br>**Figure 118** Copy<br>  <br>3. Select a line card to which you want to copy settings.<br>4. Select the check boxes of the DSL ports on the line card to which you want to copy the settings. Click **Select All** to mark all of the port check boxes or click **Select None** to clear all of the port check boxes.<br>5. Click **Apply** to copy the settings to all of the ports that you have selected in this screen. Click **Cancel** to close the screen without saving changes. |
| Delete | Click **Delete** to remove the selected PVC. |
| VPI / VCI | Type the Virtual Path Identifier and Virtual Circuit Identifier for a channel on this port. |
| PVID | Type a PVID (Port VLAN ID) to assign to untagged frames received on this channel.<br>This must be the VLAN ID of a VLAN that is already configured. The port that you are configuring must also be set to the fixed status in the VLAN. |
| Profile | Use the drop-down list box to select an ATM profile to assign to this channel. |
| MUX | Select the encapsulation type (**llc** or **vc**) for this channel. |
| Priority | Type the priority value (0 to 7) to add to incoming frames without a (IEEE 802.1p) priority tag. |
| Mvlan Enable | Select this option to turn on multicast VLAN for this PVC.<br>Multicast VLAN allows one single multicast VLAN to be shared among different subscriber VLANs on the network. This improves bandwidth utilization by reducing multicast traffic in the subscriber VLANs and simplifies multicast group management. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |

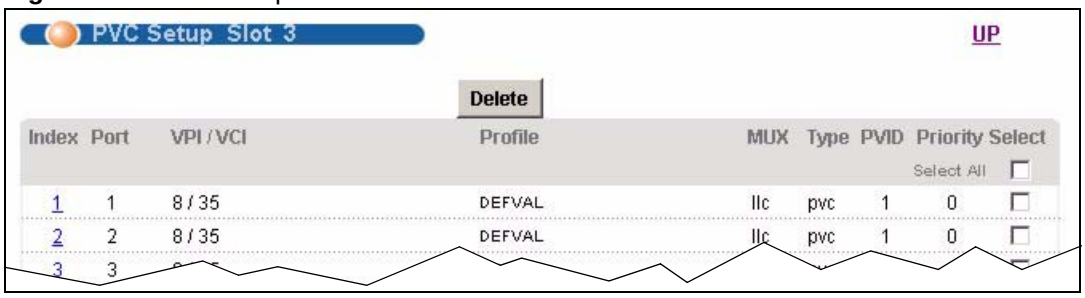
**Table 89** PVC Setup (continued)

| LABEL | DESCRIPTION |
|---|---|
| Cancel | Click **Cancel** to begin configuring the screen again. |
| ID | This column lists the slot numbers of the line cards. Click the ID number of an active DSL line card to go to a screen where you can view and delete PVCs from the line card's DSL ports. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 11.11.1 PVC Setup Slot Screen

Click **Port** > **PVC** in the navigation panel to open the **PVC Setup** screen. Click an active ADSL or SHDSL line card's ID number to open the following screen. Use this screen to view and delete PVCs from the line card's DSL ports.

**Figure 119** PVC Setup: Slot


PVC Setup Slot 3
UP
Delete
Index Port VPI / VCI Profile MUX Type PVID Priority Select
Select All
1 1 8 / 35 DEFVAL llc pvc 1 0
2 2 8 / 35 DEFVAL llc pvc 1 0
3 3

The following table describes the fields in this screen.

**Table 90** PVC Setup: Slot

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| Delete | Click **Delete** to remove the selected PVC(s). |
| Index | This is the number of the PVC. Click a number to open a screen where you can add the PVC to more VLANs (or remove it from VLANs). |
| Port | This is the number of a DSL port on the line card. |
| VPI / VC | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI). The VPI and VCI identify a channel on this port. |
| Profile | This field displays the ATM profile that this channel uses. |
| MUX | This field displays the encapsulation type (**llc** or **vc**) for this channel. |
| Type | This field shows that the channel is a PVC. |

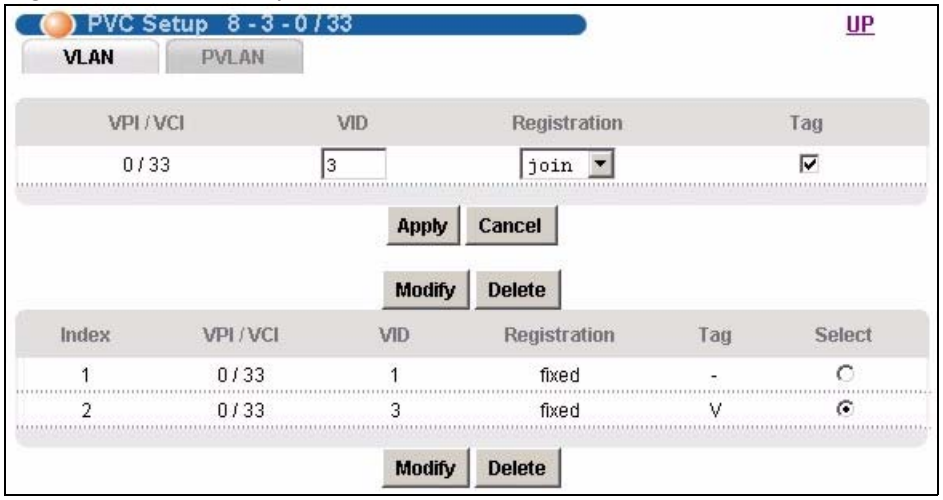
**Table 90** PVC Setup: Slot (continued)

| LABEL | DESCRIPTION |
|---|---|
| PVID | This field displays the PVID (Port VLAN ID) to assign to untagged frames received on this channel. |
| Priority | This field displays the priority value (0 to 7) that the line card adds to frames that come in on this PVC without a (IEEE 802.1p) priority tag. |
| Select | Select one or more PVCs' check boxes and then use the **Delete** button to remove it (or them). Use the **Select All** check box to select all of the PVCs for all of the line card's ports. |

## 11.11.2 PVC Setup VLAN Screen

Click **Port** > **PVC** in the navigation panel to open the **PVC Setup** screen. Click an active ADSL or SHDSL card ID and a PVC's index number to open the following screen. Use this screen to add the PVC to more VLANs (or remove it from VLANs). You can also get to this screen by clicking a PVC's index number in the **PVC Setup Slot** screen.

**Figure 120** PVC Setup: VLAN




The following table describes the fields in this screen.

**Table 91** PVC Setup: VLAN

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| VPI / VCI | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI). The VPI and VCI identify the channel. |
| VID | Type a VID (VLAN ID) to add this channel as a member.<br>This must be the VLAN ID of a VLAN that is already configured. The port that you are configuring must also be set to the fixed status in the VLAN. |
| Registration | Select **join** to have the port be a member of the specified VLAN.<br>Select **leave** to remove the port from the specified VLAN. |
| Tag | Select the check box to tag all frames that are transmitted out on this PVC with this VLAN group ID. |

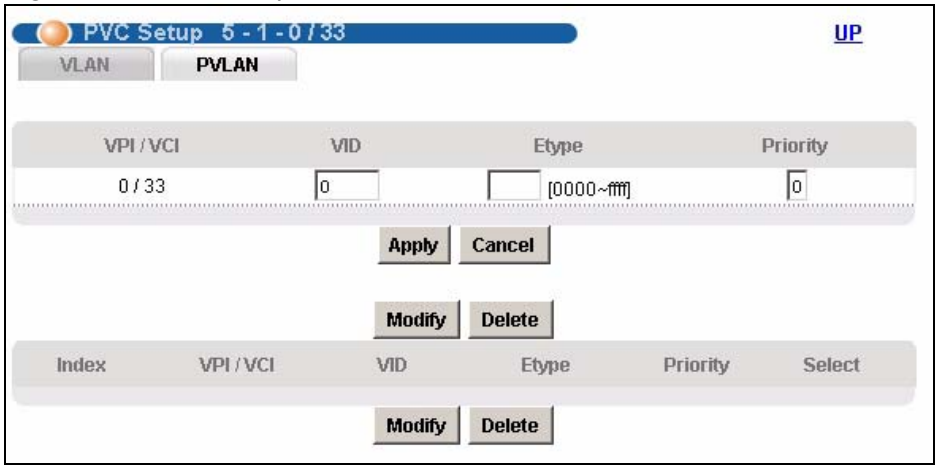
**Table 91** PVC Setup: VLAN (continued)

| LABEL | DESCRIPTION |
|---|---|
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| The table in the bottom half of the screen lists the VLANs that the PVC is a member of. | |
| Modify | Click **Modify** to display the selected VLAN membership entry's settings in the fields above so you can edit them. |
| Delete | Click **Delete** to remove the selected VLAN membership entry. |
| Index | This is the number of the VLAN membership entry. |
| VPI / VCI | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI). The VPI and VCI identify the channel. |
| VID | This field displays the number of a VLAN (VLAN ID) of which this channel is a member. |
| Registration | This field displays "fixed" to indicate that the port is a member of the specified VLAN. |
| Tag | This field displays "V" if the line card is to tag all frames that are transmitted out on this PVC with this VLAN group ID. It displays "-" if the line card does not tag all frames that are transmitted out on this PVC with this VLAN group ID. |
| Select | Select the radio button of a VLAN membership entry and then use the **Modify** button or the **Delete** button. |

## 11.11.3 PVC Setup PVLAN Screen

Click **Port** > **PVC** in the navigation panel to open the **PVC Setup** screen. Click an active ADSL or SHDSL card ID and a PVC's index number and then click the **PVLAN** tab to open the following screen. This feature also applies to VDSL2 line cards since they can fall back to ADSL. Use this screen to configure Protocol VLAN (PVLAN) settings for the PVCs. PVLAN adds a VLAN ID and IEEE 802.1p priority to a specific protocol's untagged traffic.

**Figure 121** PVC Setup: PVLAN



The following table describes the fields in this screen.

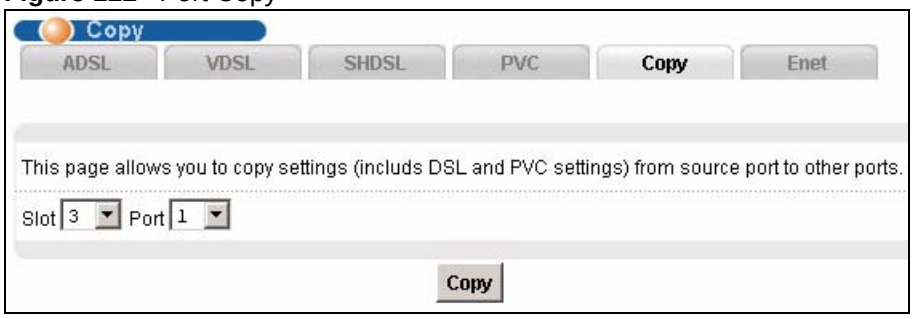
**Table 92** PVC Setup: PVLAN

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| VPI / VCI | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI). The VPI and VCI identify the channel. |
| VID | Type a VID (VLAN ID) to add this channel as a member.<br>This must be the VLAN ID of a VLAN that is already configured. The port that you are configuring must also be set to the fixed status in the VLAN. |
| Etype | Enter 4 digits in hexadecimal for Ethernet type which specify a protocol traffic. For example, 0806 is the Ethernet type, 0x0806, for ARP (Address Resolution Protocol) traffic. |
| Priority | Enter the priority level for the protocol VLAN. "0" is the lowest priority level and "7" is the highest. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Modify | Click **Modify** to display the selected VLAN membership entry's settings in the fields above so you can edit them. |
| Delete | Click **Delete** to remove the selected VLAN membership entry. |
| The table in the bottom half of the screen lists the PVLANs of which the PVC is a member. | |
| Index | This is the number of the VLAN membership entry. |
| VPI / VCI | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI). The VPI and VCI identify the channel. |
| VID | This field displays the number of the VLAN (VLAN ID) of which this channel is a member. |
| Etype | This field displays the Ethernet type of the VLAN of which this channel is a member. |
| Priority | This field shows the priority of the VLAN of which this channel is a member. |
| Select | Select the radio button of a VLAN membership entry and then use the **Modify** button or the **Delete** button. |
| Modify | Click **Modify** to display the selected VLAN membership entry's settings in the fields above so you can edit them. |
| Delete | Click **Delete** to remove the selected VLAN membership entry. |

## 11.12 Port Copy Screen

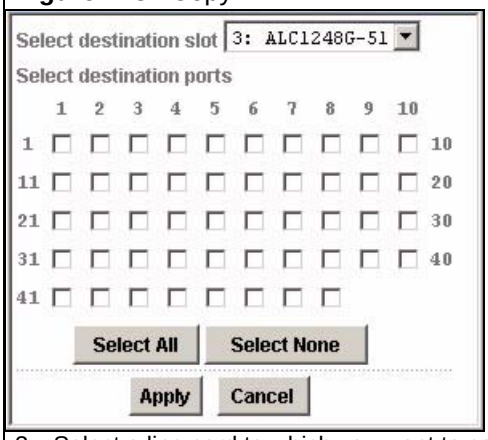
Click **Port > Copy** in the navigation panel to open the following screen. Use this screen to copy subscriber port, VLAN and PVC settings from one DSL port to another DSL port or ports.

**Figure 122** Port Copy




The following table describes the fields in this screen.

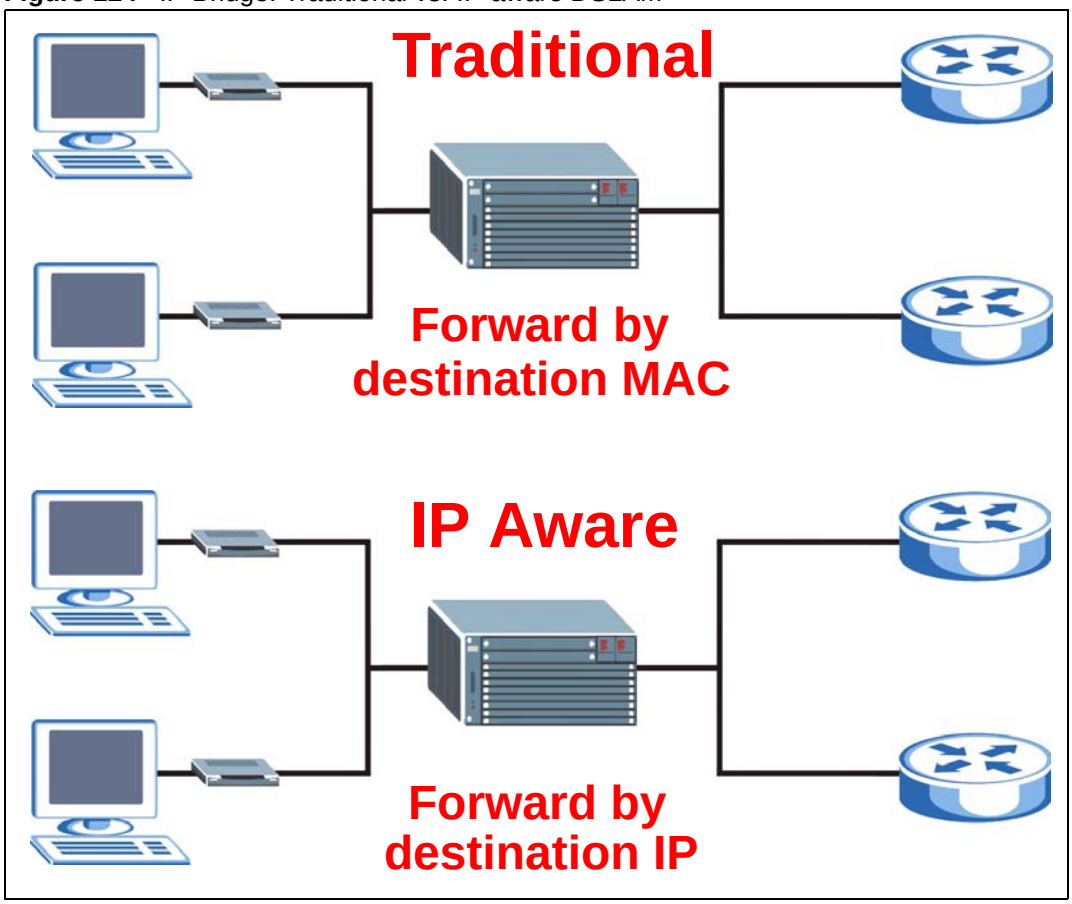
**Table 93** Port Copy

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the number of a line card's slot. |
| Port | Select the number of a DSL port on the line card. |
| Copy | Do the following to copy settings from one DSL port to another DSL port or ports.<br>1. Use the **Slot** and **Port** drop-down list boxes to select the number of the DSL port from which you want to copy settings.<br>2. Click **Copy** to open the following screen.<br><br>**Figure 123** Copy<br>  <br><br>3. Select a line card to which you want to copy settings.<br>4. Select the check boxes of the DSL ports on the line card to which you want to copy the settings. Click **Select All** to mark all of the port check boxes or click **Select None** to clear all of the port check boxes.<br>5. Click **Apply** to copy the settings to all of the ports that you have selected in this screen. Click **Cancel** to close the screen without saving changes. |

## 11.13 IP Bridge Overview

The IP bridge function is designed for large-scale, flat, access networks, and it is ideal when the network is based on Ethernet. When the IP bridge is enabled, the system forwards frames based on the destination IP address, instead of the destination MAC address, and it replaces the source MAC address with its own MAC address.

**Figure 124** IP Bridge: Traditional vs. IP-aware DSLAM




The IP-aware MSC1000G does not modify the IP packet header, but it uses the destination IP address to modify the layer-2 header, in particular the source MAC address, destination MAC address, and VLAN tag. As a result, the MSC1000G prevents the MAC addresses and VLAN ID downstream of the MSC1000G (in other words, the subscribers' MAC addresses and VLAN ID) from propagating into the network upstream of the MSC1000G, and vice versa.

In the end, the IP-aware MSC1000G makes the network more secure and more scalable, as explained below.

- User-to-user security. The MSC1000G does not forward subscribers' MAC addresses upstream of the MSC1000G, so there is no way for subscribers to know each other's MAC addresses. This prevents the spoofing of MAC addresses and IP addresses upstream of the MSC1000G.
- Scalability. The scale of access networks is typically limited by the number of MAC addresses in the network. Since the MSC1000G does not forward subscribers' MAC addresses or VLAN ID upstream, the upstream network is more scalable, and it is simpler to use the same VLAN ID upstream of several MSC1000G. In addition, the MSC1000G drastically reduces the scale of ARP traffic storms.

The MSC1000G itself is transparent in the network.

### 11.13.1 Upstream and Downstream Traffic

When the MSC1000G forwards upstream traffic, it makes the following changes in the layer-2 header.

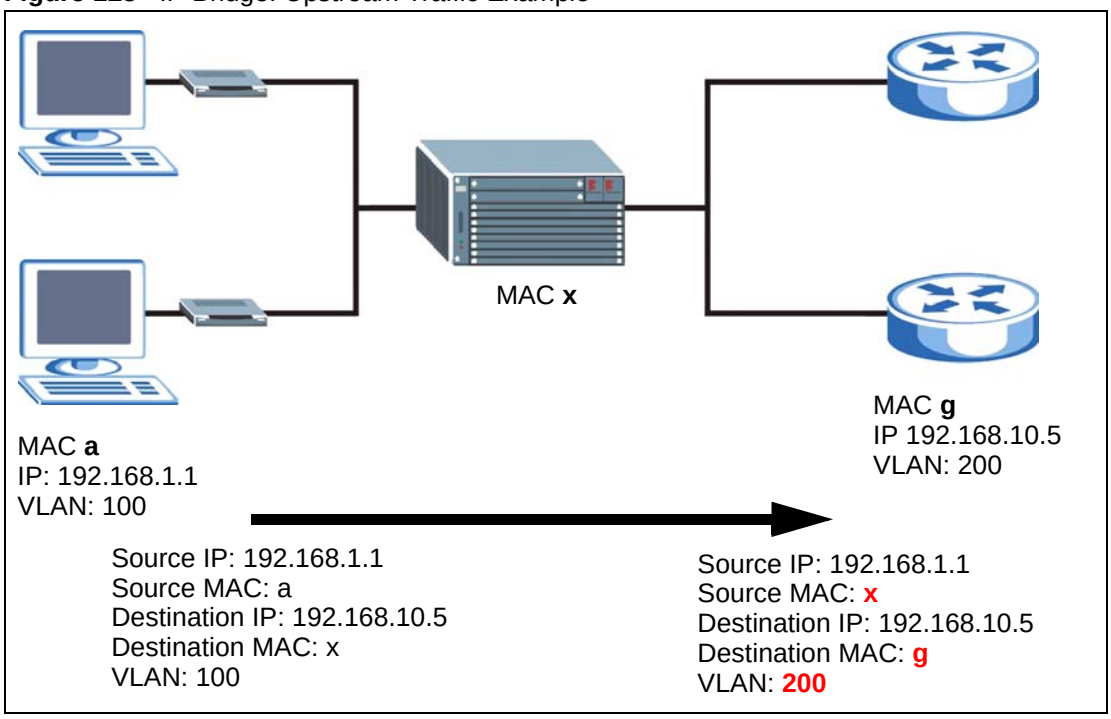
**Table 94** IP Bridge: Layer-2 Header for Upstream Traffic

| | ORIGINAL | UPDATED |
|---|---|---|
| Source MAC address | Subscriber's MAC address | MSC1000G's MAC address |
| Destination MAC address | MSC1000G's MAC address | Destination IP's MAC address |
| VLAN ID | Subscriber's VLAN ID | Destination IP's VLAN ID |

The original frame has the MSC1000G's MAC address as the destination MAC address because the MSC1000G, not the device that really has the destination IP, responded to the ARP request for the destination IP. (This is part of the ARP proxy feature for IP bridges.) Once the MSC1000G receives the frame, it updates the MAC addresses and VLAN ID and forwards it to the device that really has the destination IP.

This is illustrated in the following example.

**Figure 125** IP Bridge: Upstream Traffic Example




Notice that the MSC1000G does not change the IP packet header.

The process is reversed but otherwise similar for downstream traffic. The MSC1000G learns how to forward frames to the appropriate subscriber from one of the following sources.

- DHCP snooping. The IP-aware MSC1000G snoops DHCP packets, so it knows what IP addresses have been assigned to subscribers.
- ARP. The MSC1000G uses ARP to find out which subscriber has a particular IP address.
- Static information. You should provide forwarding information manually for subscribers that have static IP addresses and do not respond to ARP queries.

## 11.13.2 IP Bridge Settings

The IP bridge function consists of the following settings.

- Domains and VLANs
- Edge routers
- Downlink interfaces
- Routing tables
- PVCs
- ARP proxy settings

Each set of settings is discussed in more detail in the following sections.

### 11.13.2.1 Domains and VLAN

A domain represents an ISP. Each domain is defined by (and dominates) the VLAN that are in it and has its own routing table and ARP table. As a result, two or more VLANs in different domains can use the same IP subnet, and one network can support multiple ISPs.

VLANs in IP bridges are exclusive. They can be in at most one domain. In addition, VLANs in IP bridges share the same VLAN space as regular VLANs, so VLANs in IP bridges must have different VLAN IDs than regular VLANs.

#### *11.13.2.1.1 Configuring VLANs for Domains*

To add a VLAN to a domain,

1. Add (Join) a new (undefined) VLAN ID to the domain.
2. Create the VLAN in the system using the regular screens or commands for VLANs.

To remove a VLAN from a domain,

1. Delete the VLAN from the system using the regular screens or commands for VLANs.
2. Remove (Leave) the VLAN ID from the domain.

### 11.13.2.2 Edge Routers

Edge routers are usually the gateways that are provided to the subscribers. They can also be gateways that are specified in static routing table entries. Each edge router, in addition to its IP address, has an associated VLAN ID. When the MSC1000G forwards a frame to an edge router, it uses this VLAN ID to replace whatever VLAN ID the subscriber specified. The MSC1000G also uses the VLAN ID to identify the domain the edge router is in.

If two edge routers are in different domains, it is possible for them to have the same IP address.

### 11.13.2.3 Downlink Interfaces

Downlink interfaces provide forwarding information for downstream traffic. The MSC1000G learns some of this information by snooping DHCP packets. For static IP addresses, you should provide this information manually. In this case, specify the VLAN ID and, optionally, the PVC for a range of IP addresses. The MSC1000G uses the VLAN ID to identify the domain the downlink interface is in. Downlink interfaces in the same domain cannot have overlapping IP addresses.

#### 11.13.2.4 Routing Tables

Each domain has its own routing table. Each routing table contains entries that, based on the destination IP address, control where the MSC1000G forwards packets (for upstream and downstream traffic). The MSC1000G automatically creates routing table entries for each downlink interface and for each edge router in the domain. You can create additional entries by specifying the edge router to which the MSC1000G should forward traffic for a particular destination IP address or IP subnet.

#### 11.13.2.5 PVCs

IP bridge PVCs are similar to regular PVCs and are endpoints of the IP bridge. In addition, IP bridge PVCs are one of two types, IP over Ethernet or IP over ATM, depending on the underlying network.

The PVID is used to identify the domain the PVC is in, so the PVID must be in a domain.

#### 11.13.2.6 ARP Proxy Settings

The MSC1000G is an ARP proxy for edge routers and subscribers in an IP bridge. You can configure basic settings for this, and you can look at (and flush, in some cases) the (PVC, MAC, IP, VID) information the MSC1000G has learned using DHCP snooping and ARP.

### 11.13.3 IP Bridge Configuration

Follow these steps to set up a simple IP bridge.

1. Create a domain. (Each domain is an ISP.)
2. Create one or more VLANs in the domain. (For example, one VLAN is for high-speed Internet, and another VLAN is for VoIP.)
3. Create the VLAN in the system using the regular screens or commands for VLANs.
4. Specify one or more edge routers for the domain.
5. Create routing table entries, so the MSC1000G forwards frames to the appropriate edge router.
6. Create downlink interfaces, so the MSC1000G forwards frames to the appropriate subscribers.
7. Create PVCs for the subscribers.

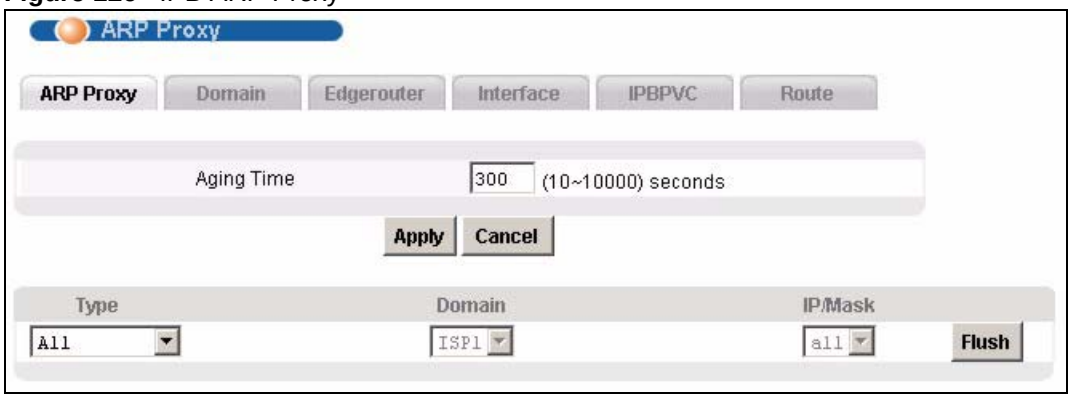
## 11.14 IPB ARP Proxy Screen

Use this screen to configure how long the MSC1000G keeps entries in the ARP table. You can also flush the Address Resolution Protocol (ARP) table for each domain.

To open this screen, click **Port > IP Bridge**.

See Section 13.7 on page 307 for how to display the ARP table for each domain.

**Figure 126** IPB ARP Proxy




The following table describes the labels in this screen.

**Table 95** IPB ARP Proxy

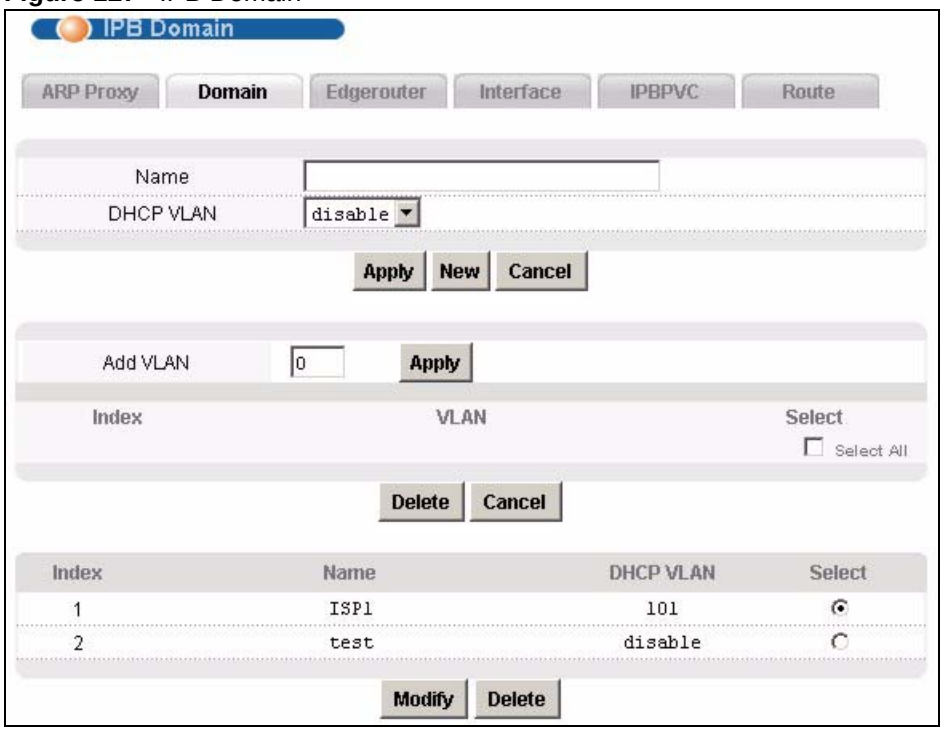
| LABEL | DESCRIPTION |
|---|---|
| Aging Time | Enter a number of seconds (10~10000) to set how long the MSC1000G keeps ARP table entries for IP bridge domains. |
| Apply | Click **Apply** to save your changes to the MSC1000G's volatile memory.<br>The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Type | Select whether you want to clear edge router, interface (or all) ARP table entries. |
| Domain | Select the domain whose ARP table you want to clear. |
| IP/Mask | Select the IP address and subnet mask bit number whose ARP table you want to clear. |
| Flush | Click **Flush to** remove entries from the ARP table. |

## 11.15 IPB Domain Screen

Use this screen to set up and maintain domains in an IP bridge. A domain represents an ISP. Each domain is defined by (and dominates) the VLAN that are in it and has its own routing table and ARP table.

To open this screen, click **Port** > **IP Bridge** > **Domain**.

**Figure 127** IPB Domain




The following table describes the labels in this screen.

**Table 96** IPB Domain

| LABEL | DESCRIPTION |
|---|---|
| Name | Enter the name of the domain you want to create. You can use 1-31 printable English keyboard characters, except for right angle brackets (>). Spaces are not allowed. |
| DHCP VLAN | Select the VLAN where the domain's DHCP server is located. If you select a specific VLAN, the MSC1000G forwards subscribers' DHCP packets to the selected VLAN and changes the source MAC address to the MSC1000G's MAC address. Select **Disabled** if there is no DHCP server for the domain, in which case the MSC1000G does not change the source MAC address in DHCP packets.<br>This setting has no effect on DHCP packets that come from VLANs where the MSC1000G's DHCP relay settings are active. See Chapter 16 on page 395. The DHCP relay settings take precedence over the IP bridge DHCP VLAN setting. The MSC1000G also still adds whatever Option 82 information is specified for the VLAN in the DHCP relay settings. |
| Apply | Click **Apply** to create the domain. It is then displayed in the summary table at the bottom of the screen.<br>Clicking **Apply** saves your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| New | Click **New** to set the screen to configure a new entry. |
| Cancel | Click **Cancel** to start configuring this section of the screen again. |
| Add VLAN | Enter the ID of the VLAN you want to add to the domain. |

**Table 96** IPB Domain (continued)

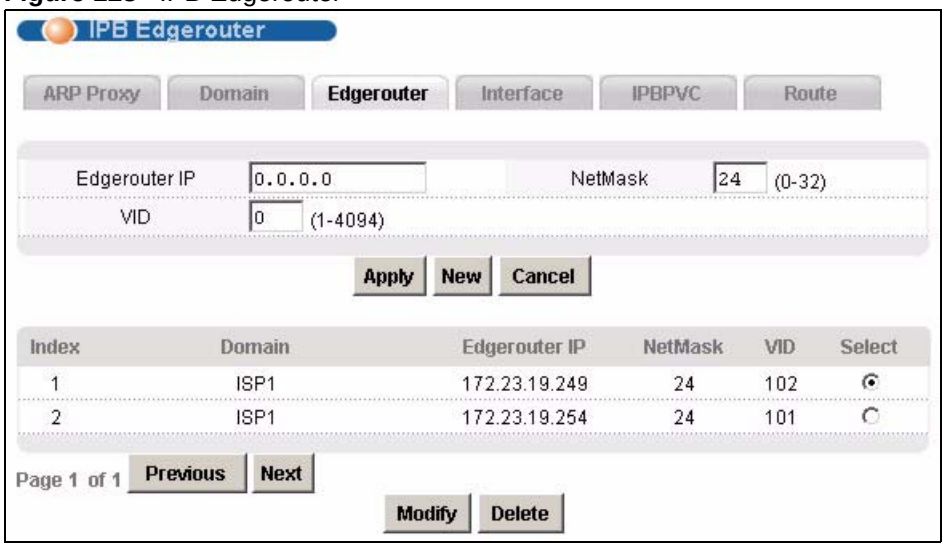
| LABEL | DESCRIPTION |
|---|---|
| Apply | Click **Apply** to add the VLAN to the domain. It then appears in the table below. Clicking **Add** saves your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| Index | This field displays the index number of the VLAN in the domain. |
| VLAN | This field displays the ID of each VLAN in the domain. |
| Select | Select the check box in the **Select** column for an entry and click **Delete** to remove the entry.<br><br>Note: You have to delete every IP bridge setting (including DHCP VLAN) that uses the selected VLAN before you can remove it from the domain. |
| Select All | Click this to select all entries in the table. |
| Cancel | Click **Cancel** to start configuring this section of the screen again. |
| Index | This field displays the number of the domain. |
| Name | This field displays the name of each domain. |
| DHCP VLAN | This field displays the VLAN where the domain's DHCP server is located (or **disabled** if there is no DHCP server for the domain). |
| Select<br>Modify<br>Delete | Select the radio button in the **Select** column for an entry. Click **Modify** to edit the entry or **Delete** to remove it. |

## 11.16 IPB Edgerouter Screen

Use this screen to set up and maintain edge routers in an IP bridge. Edge routers are usually the gateways that are provided to the subscribers. They can also be the gateways that are specified in static routing table entries. If two edge routers are in different domains, it is possible for them to have the same IP address.

To open this screen, click **Port > IP Bridge > Edgerouter**.

**Figure 128** IPB Edgerouter




The following table describes the labels in this screen.

**Table 97** IPB Edgerouter

| LABEL | DESCRIPTION |
|---|---|
| Edgerouter IP | Enter the IP address of the edge router. |
| NetMask | Enter the number of bits in the subnet mask of the edge router. |
| VID | Enter the ID of the VLAN of which the edge router is a member. The MSC1000G uses this VLAN ID when it forwards frames to the edge router. It also uses the VLAN ID to identify the domain the edge router is in. You have to add the VLAN ID to an IP bridge domain before you can enter it here. |
| Apply | Click **Apply** to create the edge router setting. It is then displayed in the summary table at the bottom of the screen.<br>Clicking **Apply** saves your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| New | Click **New** to set the screen to configure a new entry. |
| Cancel | Click **Cancel** to start configuring this section of the screen again. |
| Index | This field displays the number of the edge router. |
| Domain | This field displays the name of the domain to which the edge router belongs. |
| Edgerouter IP | This field displays the IP address of the edge router. |
| NetMask | This field displays the number of bits in the subnet mask of the edge router. |
| VID | This field displays the VLAN ID of the edge router. |
| Select<br>Modify<br>Delete | Select the radio button in the **Select** column for an entry and click **Modify** to be able to edit the entry or **Delete** to remove it. |
| Page X of X | This identifies which page of information is displayed and the total number of pages of information. |
| Previous/Next | Click one of these buttons to show the preceding/following screen if the information cannot be displayed in one screen. |

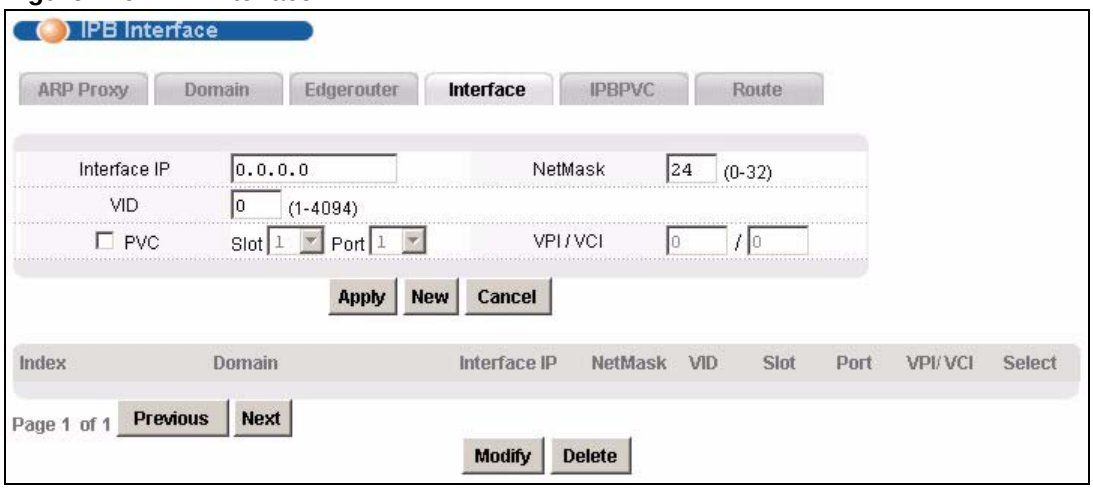
# 11.17 IPB Interface Screen

Use this screen to set up and maintain forwarding information for downstream traffic. The MSC1000G learns some of this information by snooping DHCP packets. For static IP addresses, you should provide this information manually. Downlink interfaces in the same domain cannot have overlapping IP addresses.

To open this screen, click **Port** > **IP Bridge** > **Interface**.

See Section 13.8 on page 308 for how to display all the forwarding information for downstream traffic, whether learned by snooping DHCP packets or provided manually.

**Figure 129** IPB Interface




The following table describes the labels in this screen.

**Table 98** IPB Interface

| LABEL | DESCRIPTION |
|---|---|
| | Use the top section to create downlink interfaces manually. |
| Interface IP<br>NetMask | Enter the IP address and the number of bits in the subnet mask that define the range of IP addresses to which this downlink interface applies. If the destination IP address of a packet is in this range, the MSC1000G tries to forward the frame to a subscriber in the specified VLAN or PVC. Downlink interfaces in the same domain cannot have overlapping IP addresses. |
| VID | Enter the VLAN ID the subscriber is in. The MSC1000G uses this VLAN ID when it forwards frames to the subscriber. It also uses the VLAN ID to identify the domain the downlink interface is in. You have to add the VLAN ID to an IP bridge domain before you can enter it here. |
| PVC, Slot, Port | Select the **PVC** check box if you want the MSC1000G to forward frames to a specific channel in the specified VLAN. Use the **Slot** and **Port** drop-down list boxes to select the line card and port for the channel.<br><br>Note: Make sure you specify a valid IP bridge PVC. Do not specify PVCs that are not defined in the **IPBPVC** screen in Section 11.18 on page 238. |
| VPI/VCI | These fields apply if you select the **PVC** check box. Type the Virtual Path Identifier and Virtual Circuit Identifier for a channel on this port. |

**Table 98** IPB Interface (continued)

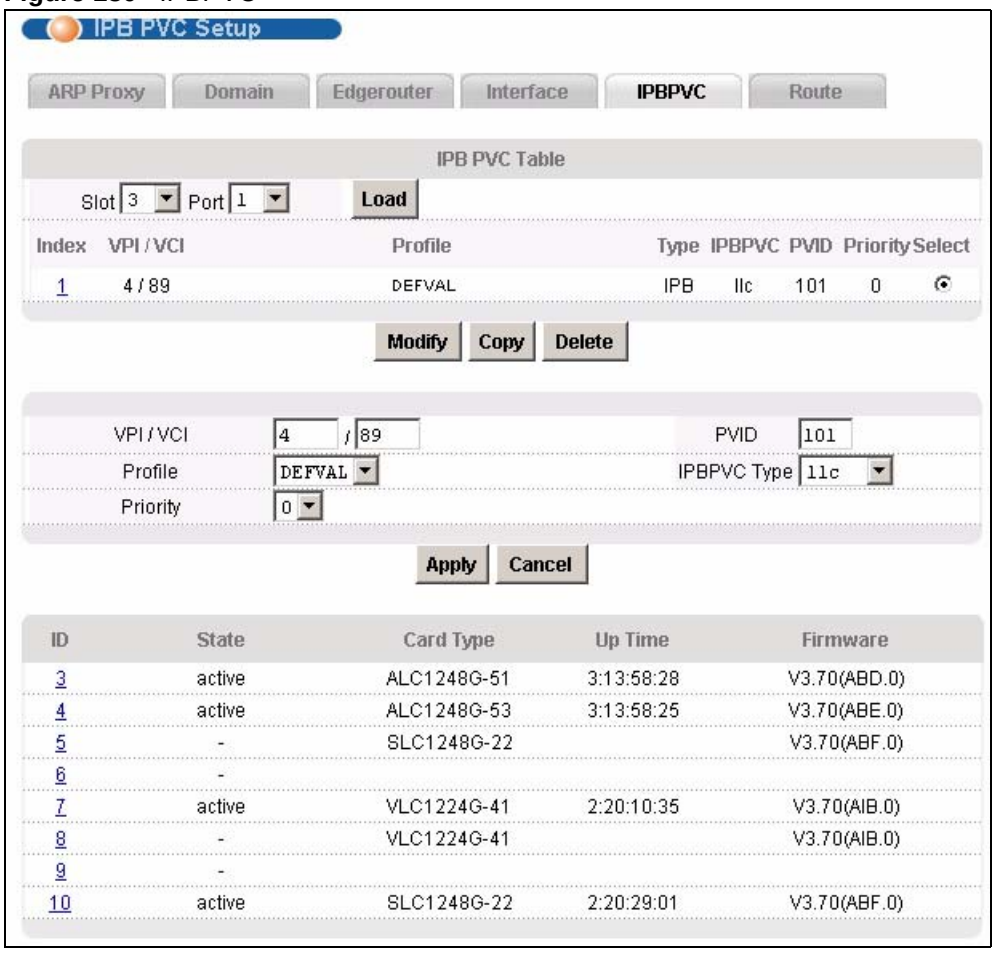
| LABEL | DESCRIPTION |
|---|---|
| Apply | Click **Apply** to create the downlink interface. It is then displayed in the summary table at the bottom of the screen.<br>Clicking **Apply** saves your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| New | Click **New** to set the screen to configure a new entry. |
| Cancel | Click **Cancel** to start configuring this section of the screen again. |
| | The bottom section displays downlink interfaces created manually. It does not show forwarding information learned by snooping DHCP packets. |
| Index | This field displays the index number of the downlink interface. |
| Domain | This field displays the name of the domain to which the edge router belongs. |
| Interface IP NetMask | This field displays the IP address and the number of bits in the subnet mask that define the range of IP addresses to which this downlink interface applies. If the destination IP address of a packet is in this range, the MSC1000G tries to forward the frame to a subscriber in the specified VLAN and PVC, if any. |
| VID | This field displays the VLAN ID the subscriber is in. |
| Slot | This field displays the number of the slot where the line card is located. It displays "**-**" if the MSC1000G looks for the subscriber in the whole VLAN and not a specific PVC. |
| Port | This field displays the number of the ADSL port on the line card to which the MSC1000G forwards frames. It displays "**-**" if the MSC1000G looks for the subscriber in the whole VLAN and not a specific PVC. |
| VPI/VCI | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI), if any. The VPI and VCI identify a channel on this port. |
| Select<br>Modify<br>Delete | Select the radio button in the **Select** column for an entry and click **Modify** to be able to edit the entry or **Delete** to remove it. |
| Page X of X | This identifies which page of information is displayed and the total number of pages of information. |
| Previous/Next | Click one of these buttons to show the preceding/following screen if the information cannot be displayed in one screen. |

## 11.18 IPBPVC Screen

Use this screen to set up and maintain PVCs for subscribers in an IP bridge.

To open this screen, click **Port** > **IP Bridge** > **IPBPVC**.

**Figure 130** IPBPVC




The following table describes the labels in this screen.

**Table 99** IPBPVC

| LABEL | DESCRIPTION |
|---|---|
| Slot | Use this drop-down list box to select the slot that contains a line card with a port for which you wish to set up an IP bridge PVC. |
| Port | Use this drop-down list box to select a port for which you wish to set up an IP bridge PVC. |
| Load | Click **Load** to display the port's IPB PVC settings in the fields below. |
| Index | This field displays the index number of a channel on this port. Click the index number to go to a screen where you can configure the IPB PVC's VLAN settings (see Section 11.18.1 on page 241). |
| VPI/VCI | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI). The VPI and VCI identify a channel on this port. |
| Profile | This shows which ATM profile this channel uses. |
| Type | This field displays **IPB** to indicate that this is an IPB PVC. |
| IPBPVC | **llc** and **vc** are for a PVC running on Ethernet (IPoE), **llc_r** and **vc_r** are for a PVC running on ATM (IPoA). |
| PVID | This is the VLAN ID assigned to frames received on this channel. |
| Priority | This is the priority value (0 to 7) added to incoming frames without a (IEEE 802.1p) priority tag. |

**Table 99** IPBPVC (continued)

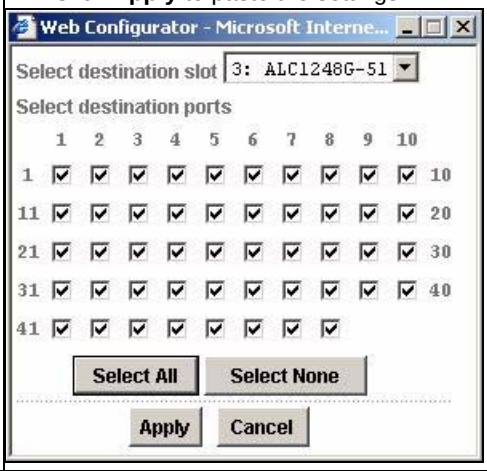
| LABEL | DESCRIPTION |
|---|---|
| Select | Select the radio button in the **Select** column for an entry and click **Modify** to be able to edit the entry, **Copy** to duplicate the entry's settings on another port, or **Delete** to remove the entry. |
| Modify | Select the radio button in the **Select** column for an entry and click **Modify** to be able to edit the entry. |
| Copy | Do the following to copy the settings you configure above to another port or ports.<br>1. Click **Copy**.<br>2. Select to which line card you want to copy the settings.<br>3. Select to which ports on the line card you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>4. Click **Apply** to paste the settings.<br>  |
| Delete | Select the radio button in the **Select** column for an entry and click **Delete** to remove the entry. |
| VPI/VCI | Type the Virtual Path Identifier and Virtual Circuit Identifier for a channel on this port. |
| PVID | Type the VLAN ID to assign to frames received on this channel. This VLAN ID must be in an IP bridge domain. |
| Profile | Use the drop-down list box to select an ATM profile to use for this channel's traffic shaping. |
| IPBPVC Type | Use the drop-down list box to specify the encapsulation type for the PVC.<br>**llc** and **vc** are for a PVC running on Ethernet (IPoE), **llc_r** and **vc_r** are for a PVC running on ATM (IPoA). |
| Priority | Use the drop-down list box to select the priority value (0 to 7) to add to incoming frames without a (IEEE 802.1p) priority tag. |
| Apply | Click **Apply** to add or save channel settings on the selected port.<br>Clicking **Apply** saves your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| ID | This is the slot number of a line card. Click the index number of an active line card that supports PVC to display a list of the IPB PVCs on the selected line card (see Section 11.18.2 on page 242). |

**Table 99** IPBPVC (continued)

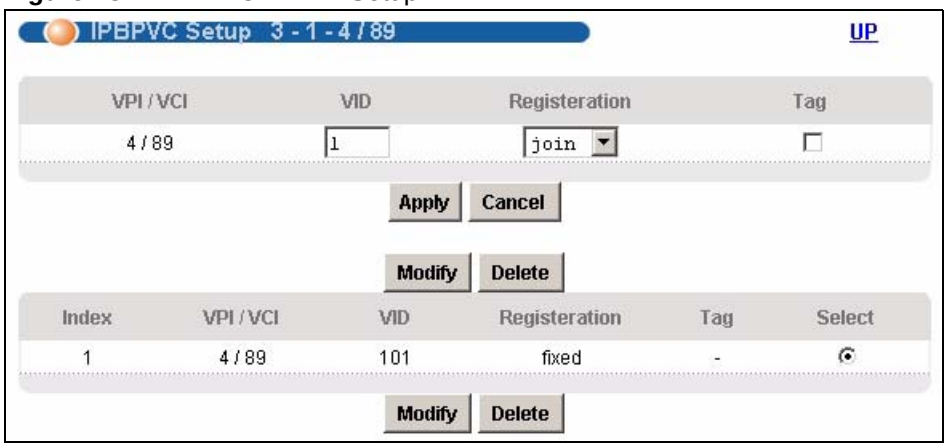
| LABEL | DESCRIPTION |
|---|---|
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 11.18.1 IPBPVC VLAN Setup Screen

Use this screen to configure a IPB PVC's VLAN settings.

To open this screen, click **Port** > **IP Bridge** > **IPBPVC** and then the index number of an IPB PVC.

**Figure 131** IPBPVC: VLAN Setup




The following table describes the labels in this screen.

**Table 100** IPBPVC: VLAN Setup

| LABEL | DESCRIPTION |
|---|---|
| UP | Click **UP** to go back to the previous screen. |
| VPI/VCI | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI). The VPI and VCI identify a IPB PVC (a channel). |
| VID | Type the VLAN ID to which this channel belongs. This VLAN ID must be in an IP bridge domain. |
| Registration | Select **join** to have the port be a member of the specified VLAN.<br>Select **leave** to remove the port from the specified VLAN. |
| Tag | Select the check box to tag all frames transmitted on this PVC with the port's VID. |

**Table 100** IPBPVC: VLAN Setup (continued)

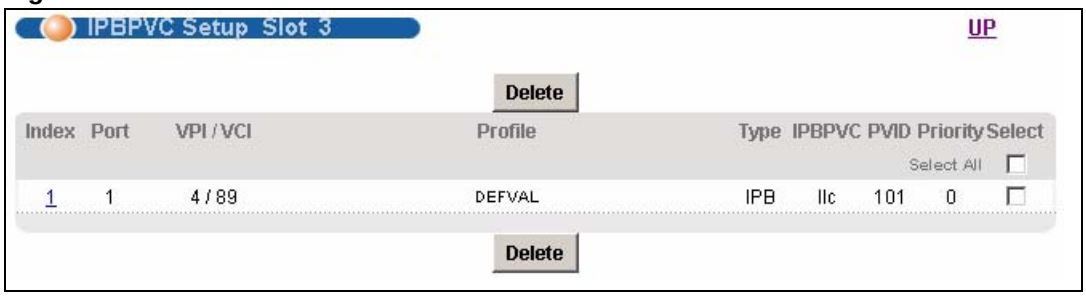
| LABEL | DESCRIPTION |
|---|---|
| Apply | Click **Apply** to save changes on the selected IPB PVC.<br>Clicking **Apply** saves your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Index | This field displays the index number of a IPB PVC on this port. |
| VPI/VCI | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI). The VPI and VCI identify a IPB PVC (a channel). |
| VID | This is the VLAN ID to which this channel belongs. |
| Registration | This field displays **fixed** to indicate that the port is a member of the specified VLAN. |
| Tag | This field displays **V** if the line card is to tag all frames that are transmitted out on this PVC with this VLAN group ID. It displays **-** if the line card does not tag all frames that are transmitted out on this PVC with this VLAN group ID. |
| Select | Select the radio button in the **Select** column for an entry and click **Modify** to be able to edit the entry, or **Delete** to remove the entry. |
| Modify | Select the radio button in the **Select** column for an entry and click **Modify** to be able to edit the entry. |
| Delete | Select the radio button in the **Select** column for an entry and click **Delete** to remove the entry. |

## 11.18.2 IPBPVC by Slot Screen

This screen displays all of the IPB PVCs on a particular line card.

To open this screen, click **Port** > **IP Bridge** > **IPBPVC** and then the index number of an active line card that supports PVC.

**Figure 132** IPBPVC: Slot


IPBPVC Setup Slot 3
UP
Delete
Index Port VPI / VCI Profile Type IPBPVC PVID Priority Select
Select All
1 1 4 / 89 DEFVAL IPB llc 101 0
Delete

The following table describes the labels in this screen.

**Table 101** IPBPVC: Slot

| LABEL | DESCRIPTION |
|---|---|
| UP | Click **UP** to go back to the previous screen. |
| Delete, Select | Select an entry's **Select** check box and click **Delete** to remove the entry. |
| Index | This field displays the index number of a IPB PVC on this slot. Click the index number to go to a screen where you can configure the IPB PVC's VLAN settings (see Section 11.18.1 on page 241). |

**Table 101** IPBPVC: Slot (continued)

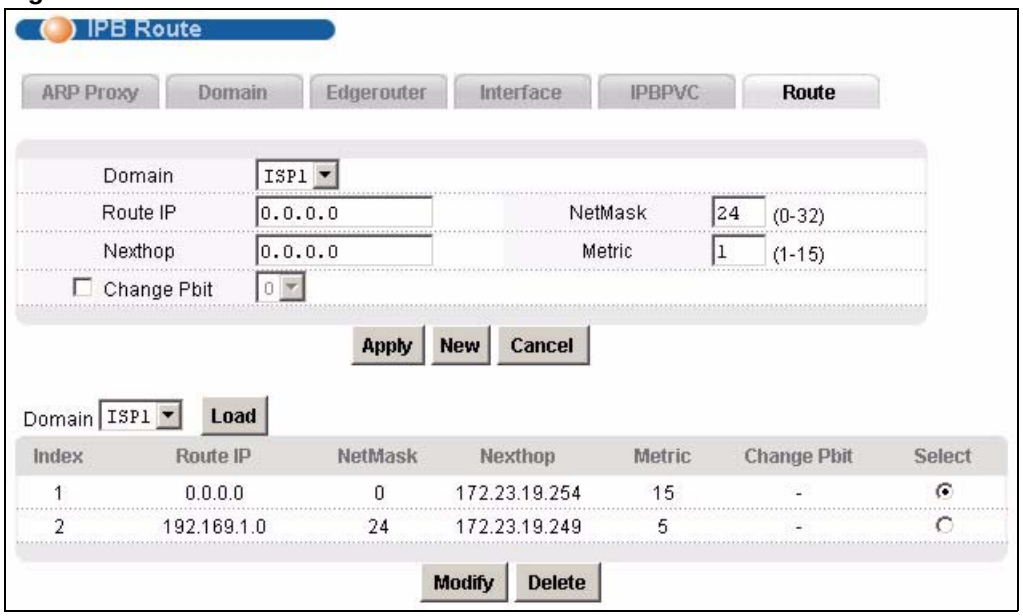
| LABEL | DESCRIPTION |
|---|---|
| Port | This field displays the port number of a port on this line card that has an IPB PVC. |
| VPI/VCI | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI). The VPI and VCI identify a IPB PVC (a channel). |
| Profile | This shows which ATM profile this channel uses. |
| Type | This field displays **IPB** to indicate that this is an IPB PVC. |
| IPBPVC | **llc** and **vc** are for a PVC running on Ethernet (IPoE), **llc_r** and **vc_r** are for a PVC running on ATM (IPoA). |
| PVID | This is the VLAN ID assigned to frames received on this channel. |
| Priority | This is the priority value (0 to 7) added to incoming frames without a (IEEE 802.1p) priority tag. |
| Select | Select the radio button in the **Select** column for an entry and click **Delete** to remove the entry. |

## 11.19 IPB Route Screen

Use this screen to set up and maintain the routing table for each domain. Each routing table contains entries that, based on the destination IP address, control where the MSC1000G forwards packets. The MSC1000G automatically creates routing table entries for each downlink interface and for each edge router in the domain that the associated VLAN is in. You can create additional entries by specifying the edge router to which the MSC1000G should forward traffic for a particular destination IP address or IP subnet.

To open this screen, click **Port** > **IP Bridge** > **Route**.

**Figure 133** IPB Route



The following table describes the labels in this screen.

**Table 102** IPB Route

| LABEL | DESCRIPTION |
|---|---|
| | Use the top section to create routing table entries manually. |
| Domain | Select the domain to whose routing table you want to add this entry. |
| Route IP<br>NetMask | Enter the IP address and the number of bits in the subnet mask that define the range of IP addresses to which this entry applies. If the destination IP address of a packet is in this range, the MSC1000G forwards the frame to the specified edge router. |
| Nexthop | Enter the IP address to which the MSC1000G forwards frames if the destination IP address of a packet is in the specified range.<br>If this IP address corresponds to an edge router in the edge router screen (see Section 11.16 on page 235), the MSC1000G uses the associated VLAN ID. In addition,<br>• If the edge router is in the same domain as the entry, the entry is used for upstream traffic.<br>• If the edge router is in a different domain than the entry, the entry is used for downstream traffic.<br>If the specified edge router is not set up in the edge router screen, the MSC1000G uses the entry for downstream traffic and does not change the VLAN ID. |
| Metric | The metric represents the “cost” of transmission for routing purposes. IP routing uses hop count as the measurement of cost, with a minimum of 1 for directly-connected networks. Select the number that approximates the cost for this link The number need not be precise, but it must be between 1 and 15. In practice, 2 or 3 is usually a good number.<br>If two entries have the same metric, the MSC1000G uses the one with the lower IP address. |
| Change Pbit | If you want to set the IEEE 802.1p priority value of incoming frames, select the check box and use the drop-down list box to select the priority value (0 to 7) to use. |
| Apply | Click **Apply** to create the routing table entry. It is then displayed in the summary table at the bottom of the screen.<br>Clicking **Apply** saves your changes to the MSC1000G’s volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| New | Click **New** to set the screen to configure a new entry. |
| Cancel | Click **Cancel** to start configuring this section of the screen again. |
| | The bottom section displays routing table entries created manually. It does not show entries added automatically by the MSC1000G. See Section 13.9 on page 309 to look at the full routing table(s) for selected domain(s). |
| Domain | Select a domain for which you wish to view information and click **Load** to display it. |
| Index | This field displays the number of the entry. |
| Route IP<br>NetMask | These fields display the IP address and the number of bits in the subnet mask that define the range of IP addresses to which this entry applies. If the destination IP address of a packet is in this range, the MSC1000G forwards the frame to the specified edge router. |
| Nexthop | This field displays the IP address to which the MSC1000G forwards frames if the destination IP address of a packet is in the specified range. |
| Metric | This field displays the “cost” of transmission for routing purposes. |

**Table 102** IPB Route (continued)

| LABEL | DESCRIPTION |
|---|---|
| Change Pbit | If you set the MSC1000G to change the IEEE 802.1p priority value of incoming frames, this field displays the priority value (0 to 7) to which the MSC1000G sets them. "**-**" displays if you do not set the MSC1000G to change the IEEE 802.1p priority value of incoming frames. |
| Select<br>Modify<br>Delete | Select the radio button in the **Select** column for an entry and click **Modify** to be able to edit the entry or **Delete** to remove it. |

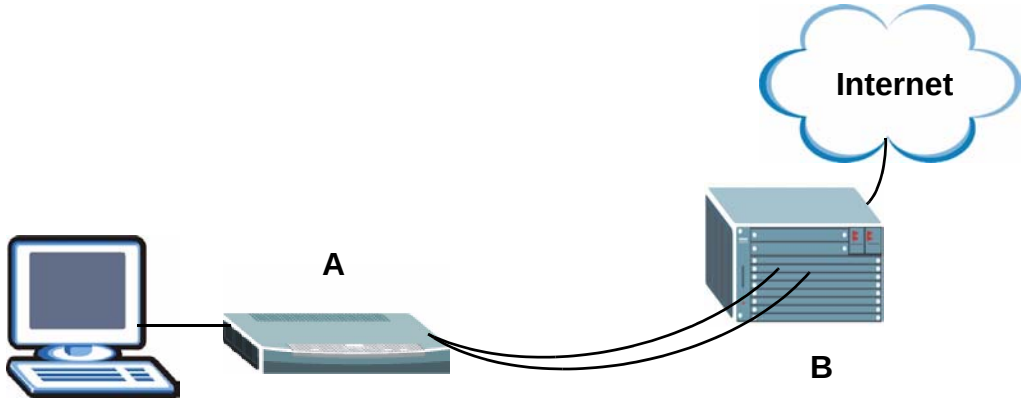
## 11.20 G.bond Screen

G.bond (also known as port bonding) allows subscribers to connect to an ISP using data streams spread over multiple DSL lines. The total available bandwidth for the subscriber then becomes the sum of the bandwidth available for each of the subscriber's line connections. As well as extra bandwidth, additional DSL lines also provide backup support.

At the time of writing, your system supports port bonding on both ADSL and SHDSL line cards. In addition, the system only supports ADSL port bonding using ZyXEL's P-663H-51, and SHDSL port bonding using ZyXEL's IES-708-22A. See the User's Guides of these CPE devices for information on their port bonding specifications.

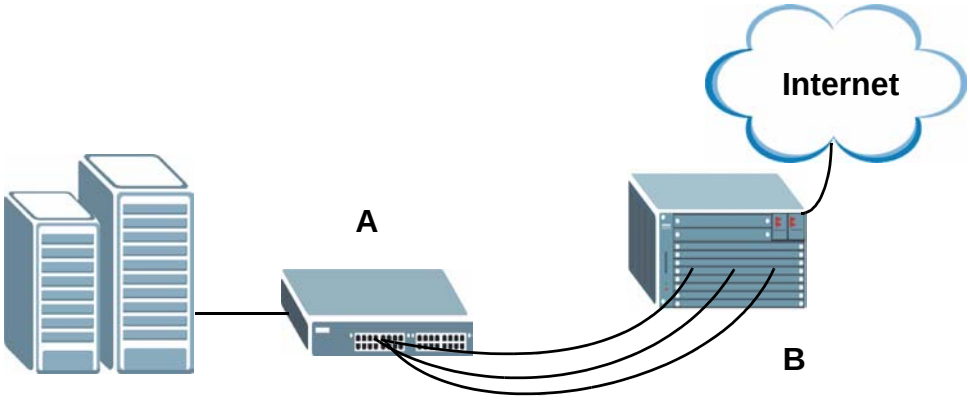
The next figure shows a subscriber using port bonding on two DSL lines between a P-663H-51 (**A**) (using a Y-connector) and an ADSL line card in the IES-5000 (**B**) to connect to the Internet.

**Figure 134** ADSL Pair Bonding Example




The next figure shows a large organization using port bonding on multiple DSL lines between an IES-708-22A (**A**) and an SHDSL line card in the IES-5000 (**B**) to connect to the Internet.

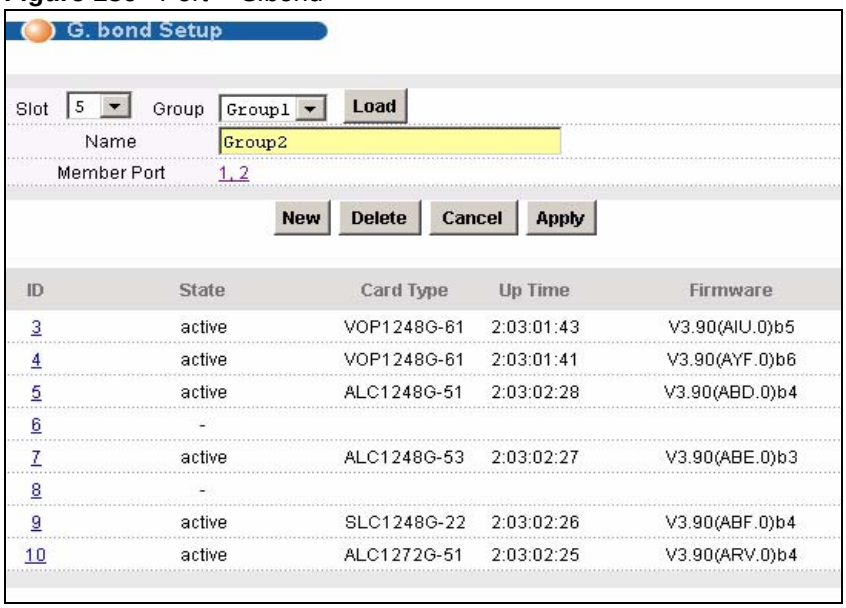
**Figure 135** SHDSL Pair Bonding Example




The following shows how to use the **G.bond Setup** screen to configure port bonding settings. Before you begin you need to have an active ADSL or SHDSL line card installed and connected to multiple DSL lines.

1. Click **Port** > **G.bond** to open the **G.bond Setup** screen.
2. Select the ID number of an active ADSL or SHDSL line card in the **Slot** field.
3. You can create a new group of DSL lines on which to use port bonding, or edit an existing group's details.
   - To create a new group, click **New**.
   - To edit an existing group, select a group from the **Group** drop down field and click **Load**.
4. Type a descriptive name in the **Name** field to identify a group of DSL lines connecting the ISP with the end-user, for example "Group1".
5. Click the link next to **Member Port** to configure the ports for this set of DSL lines. A popup list of ports appears.
6. Select the ports to be used by the DSL line group and click **Apply**. Ports may not be shared between line groups. For example, if port 1 belongs to "Group1", it may not belong to "Group2".
   - G.bond on ADSL lines only supports pairs of ports (1, 2), (3, 4) and so on up to (47, 48).
   - G.bond on SHDSL lines supports multiple ports (up to 16).
7. Click **Apply** in the **Port** > **G.bond** screen to complete setup of the G.bond settings.

**Figure 136** Port > G.bond

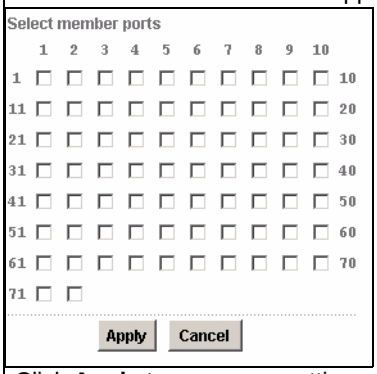

G. bond Setup
Slot 5 Group Group1 Load
Name Group2
Member Port 1, 2
New Delete Cancel Apply
ID State Card Type Up Time Firmware
3 active VOP1248G-61 2:03:01:43 V3.90(AIU.0)b5
4 active VOP1248G-61 2:03:01:41 V3.90(AYF.0)b6
5 active ALC1248G-51 2:03:02:28 V3.90(ABD.0)b4
6 -
7 active ALC1248G-53 2:03:02:27 V3.90(ABE.0)b3
8 -
9 active SLC1248G-22 2:03:02:26 V3.90(ABF.0)b4
10 active ALC1272G-51 2:03:02:25 V3.90(ARV.0)b4

The following table describes the labels in this screen.

**Table 103** Port > G.bond

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the number of a line card's slot to apply G.bond settings on traffic through this card. |
| Group | The group represents a bundle of DSL lines connecting the line card and CPE DSL device.<br>Select a group from the drop-down list. If no groups have been configured yet, click **New** to set up a new group. |
| Load | Click **Load** to display the group's G.bond settings in the **Name** and **Member Port** fields. |
| Name | Use this screen to display, set or edit a descriptive name for a group of DSL lines.<br>Select a group in the **Group** drop-down list to display the group name in the **Name** field.<br>Type a descriptive name for a group in this field or edit an existing name to set up a new group. |

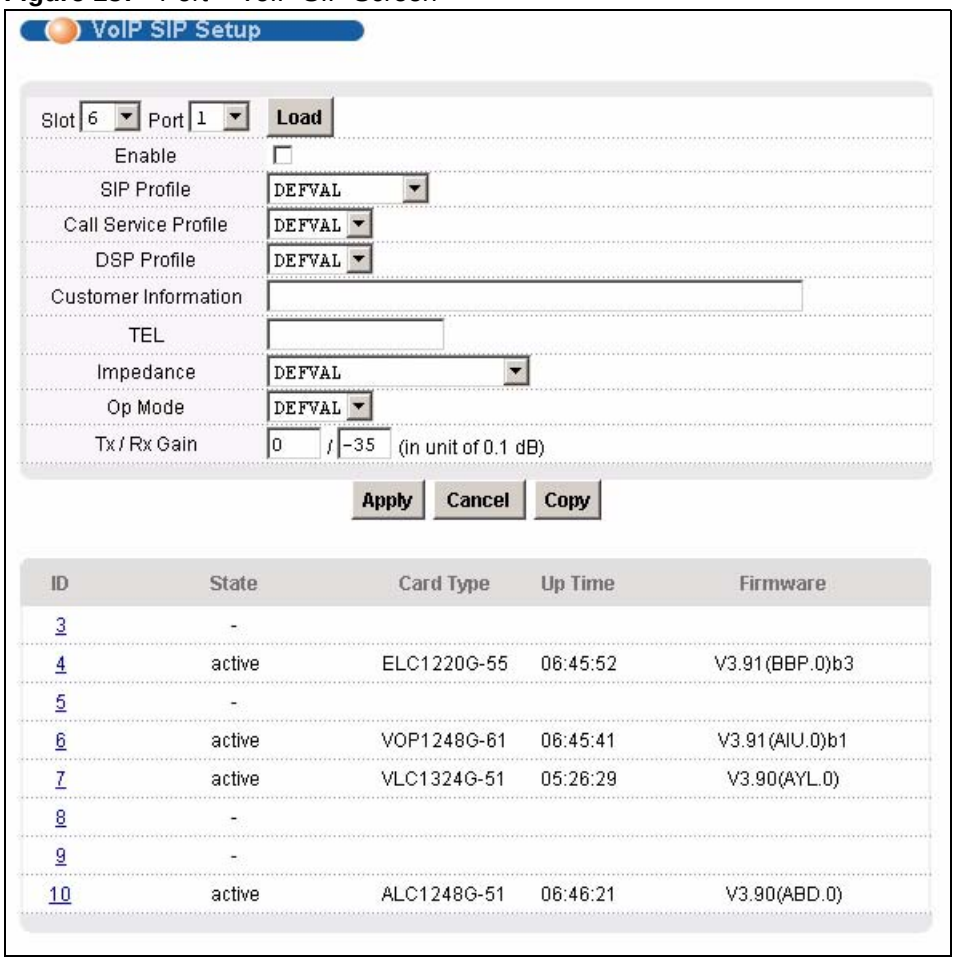
**Table 103** Port > G.bond

| LABEL | DESCRIPTION |
|---|---|
| Member Port | This link displays the ports configured to a group. If no ports have been configured to a group, the link will show "**None**".<br>Click this link to display a popup screen. Select the port(s) in this screen to allocate them to the DSL line group.<br>Ports may not be shared between line groups. For example, if port 1 belongs to "Group1", it may not belong to "Group2".<br>• G. bond on ADSL lines only supports pairs of ports (1, 2), (3, 4) and so on up to (47, 48).<br>• G. bond on SHDSL lines supports multiple ports.<br>  <br>Click **Apply** to save your settings. |
| New | Click **New** to configure a new group. |
| Delete | Click **Delete** to delete the group entry displayed. |
| Cancel | Click **Cancel** to start configuring this section of the screen again. |
| Apply | Click **Apply** to create the G.bond entry.<br>Clicking **Apply** saves your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| ID | This field displays the number of the selected line card slot. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Chapter 37 on page 767 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 11.21 The VoIP SIP Port Setup Screen

Use this screen to manage and configure the VoIP settings of each port on your SIP (Session Initiation Protocol) enabled line card(s). Click **Port** > **VoIP SIP**. The following screen displays.

**Figure 137** Port > VoIP SIP Screen




The following table describes the labels in this screen.

**Table 104** Port > VoIP SIP Setup Screen

| LABEL | DESCRIPTION |
|---|---|
| Slot<br>Port | Use the drop-down list boxes to select the port on an active VoIP line card you want to configure. |
| Load | Click this to display the port's current settings. |
| Enable | Select the check box to activate SIP-based VoIP on the specified port. |
| SIP Profile | Select the SIP profile the port is to use. The SIP profile contains information about a connection to SIP-based VoIP provider's servers.<br>If you have not configured any profiles, only the default profile **DEFVAL** can be selected. Configure SIP profiles in the **Profile** > **VoIP SIP** screen. |
| Call Service Profile | Select the call service profile the port is to use. A call service profile contains location-related information, as well as details of the call services available to subscribers.<br>If you have not configured any profiles, only the default profile **DEFVAL** can be selected. Configure call service profiles in the **Profile** > **VoIP SIP CALLSVC** screen. |

**Table 104** Port > VoIP SIP Setup Screen

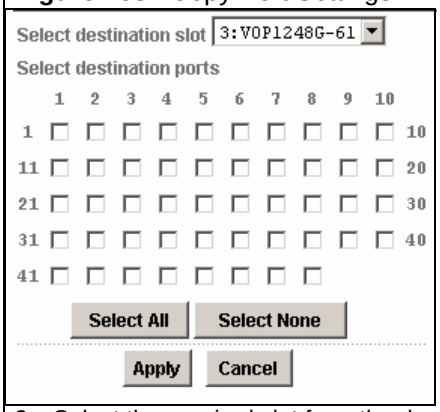
| LABEL | DESCRIPTION |
|---|---|
| DSP Profile | Select the digital signal processing profile the port is to use. A DSP profile contains information about the codecs (coders/decoders)<br>If you have not configured any profiles, only the default profile **DEFVAL** can be selected. Configure DSP profiles in the **Profile** > **VoIP DSP** screen. |
| Customer Information | Enter information to identify the subscriber connected to this port. You can use up to 31 printable ASCII characters (including spaces and hyphens). |
| TEL | Enter the telephone number of the subscriber VoIP port. This is used as part of the port's SIP URI. |
| Impedance | This field displays the default VoIP port AC impedance. The default impedance value depends on the country code (configured in the **VoIP** > **Countrycode** screen).<br>If you do not want to use the default impedance, select the required AC impedance of the VoIP port from the drop-down list. |
| Op Mode | Set the port's VoIP operation mode.<br>Select **DEFVAL** to use SIP to connect to a server.<br>Select **v5sip** to use V5.2 to connect to a traditional class 5 POTS switch. |
| Tx / Rx Gain | **Tx**: Enter the amount of gain (increase in volume) you want to apply to the signal received from the subscriber and transmitted to the SIP server.<br>**Rx**: Enter the amount of gain (increase in volume) you want to apply to the signal received from the SIP server and transmitted to the subscriber.<br>These are measured in tenths of a decibel and the range can be from -200 to 200.<br>Enter a negative value to decrease the volume. |
| Apply | Click this to save your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click this to begin configuring the fields again. |
| Copy | Use this to assign a port's settings to other ports.<br>1. Click **Copy**. The following pop-up screen displays.<br>**Figure 138** Copy Port Settings<br>  <br>2. Select the required slot from the drop-down list.<br>3. Select the port(s) to which you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>4. Click **Apply** to copy the settings, or click **Cancel** to close the window without saving any changes. |

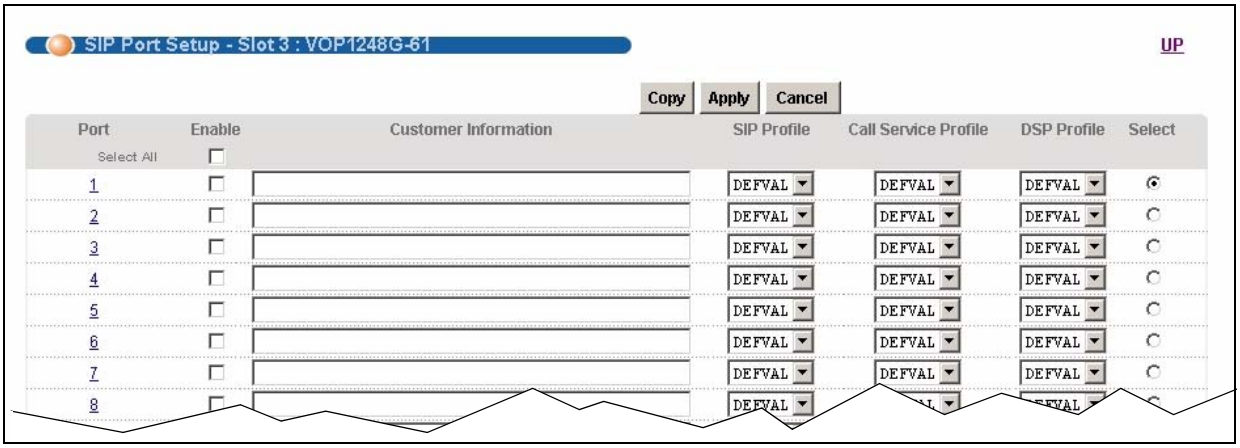
**Table 104** Port > VoIP SIP Setup Screen

| LABEL | DESCRIPTION |
|---|---|
| ID | This column displays the line card's slot number. Click a SIP line card's number to go to the card's **SIP Port Setup Line Card** screen (see Section 11.22 on page 251) where you can see and edit all a SIP line card's VoIP configuration in a single screen. |
| State | This displays **Active** if the line card is enabled, or **-** if a line card is not enabled. |
| Card Type | This displays a line card's model name. |
| Up Time | This field displays how long the line card has been running since it was started up. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 11.22 The SIP Port Setup Line Card Screen

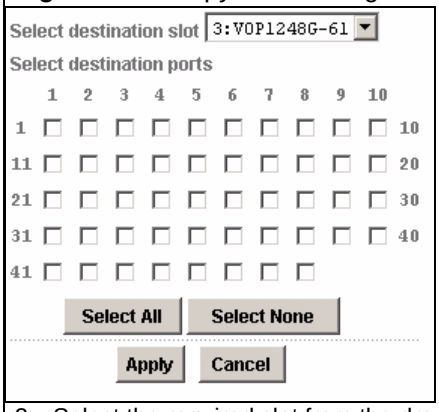
Use this screen to see and edit the current VoIP configuration of each port on a SIP VoIP line card. Click a line card's **ID** number in the **Port** > **VoIP SIP** screen. The following screen displays.

**Figure 139** The Port > VoIP SIP Setup > SIP Port Setup Line Card Screen



The following table describes the labels in this screen.

**Table 105** The Port > VoIP SIP Setup > SIP Port Setup Line Card Screen

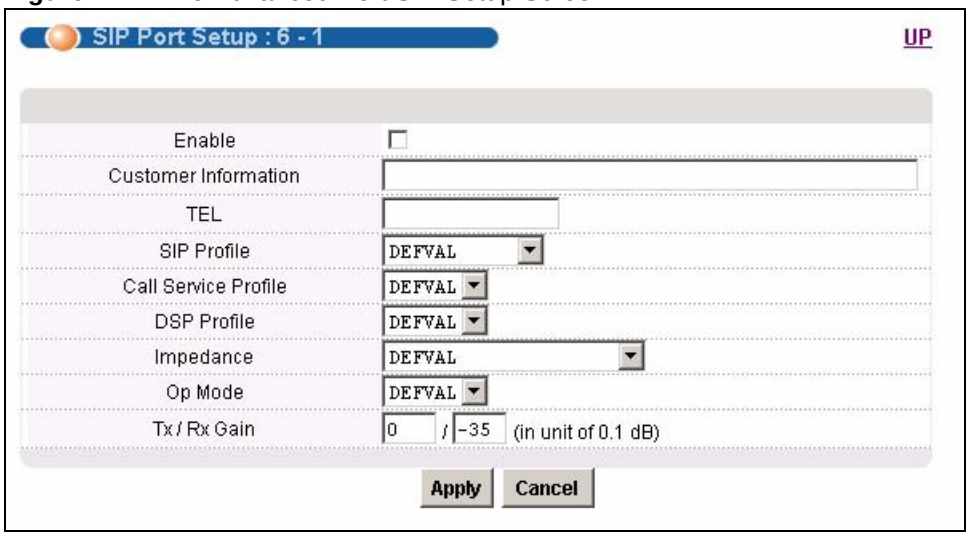
| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the **Port** > **VoIP SIP** screen. |
| Copy | Use this to assign the selected port's settings to other ports.<br>1. Click **Copy**. The following pop-up screen displays.<br>**Figure 140** Copy Port Settings<br>  <br>2. Select the required slot from the drop-down list.<br>3. Select the port(s) to which you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>4. Click **Apply** to copy the settings, or click **Cancel** to close the window without saving any changes. |
| Apply | Click this to save your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click this to begin configuring the fields again. |
| Port | These are the numbers of the line card's ports.<br>Click a port number to display the **Advanced SIP Port Setup** screen (see Section 11.23 on page 253). |
| Enable | Select a check box in this column to activate a port. Select the check box at the top of the column to activate all of the line card's ports. |
| Customer Information | Enter information to identify the subscriber connected to this port. You can use up to 31 printable English keyboard characters (including spaces and hyphens). |
| SIP Profile | Select the SIP profile the port is to use. If you have not configured any profiles, only the default profile **DEFVAL** can be selected. Configure SIP profiles in the **Profile** > **VoIP SIP** screen. |
| Call Service Profile | Select the call service profile the port is to use. If you have not configured any profiles, only the default profile **DEFVAL** can be selected. Configure call service profiles in the **Profile** > **VoIP SIP CALLSVC** screen. |
| DSP Profile | Select the digital sound processing profile the port is to use. If you have not configured any profiles, only the default profile **DEFVAL** can be selected. Configure DSP profiles in the **Profile** > **VoIP DSP** screen. |
| Select | Use this column to choose a port from which you want to copy settings. |

## 11.23 Advanced SIP Port Setup Screen

Use this screen to configure the VoIP settings of a port on your SIP VoIP line card. Click a port number in the **Port SIP Setup Line Card** screen (see Section 11.22 on page 251). The following screen displays.

The fields that display in this screen are the same as those in the **SIP Port Setup** screen (see Section 11.21 on page 248).

**Figure 141** The Advanced Port SIP Setup Screen




The following table describes the labels in this screen.

**Table 106** The Advanced Port SIP Setup Screen

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the **Port SIP Setup Line Card** screen. |
| Enable | Select the check box to activate SIP-based VoIP on this port. |
| Customer Information | Enter information to identify the subscriber connected to this port. You can use up to 31 printable ASCII characters (including spaces and hyphens). |
| TEL | Enter the telephone number of the subscriber VoIP port. This is used as part of the port's SIP URI. |
| SIP Profile | Select the SIP profile the port is to use. If you have not configured any profiles, only the default profile **DEFVAL** can be selected. Configure SIP profiles in the **Profile** > **VoIP SIP** screen. |
| Call Service Profile | Select the call service profile the port is to use. If you have not configured any profiles, only the default profile **DEFVAL** can be selected. Configure call service profiles in the **Profile** > **VoIP SIP CALLSVC** screen. |
| DSP Profile | Select the digital sound processing profile the port is to use. If you have not configured any profiles, only the default profile **DEFVAL** can be selected. Configure DSP profiles in the **Profile** > **VoIP DSP** screen. |

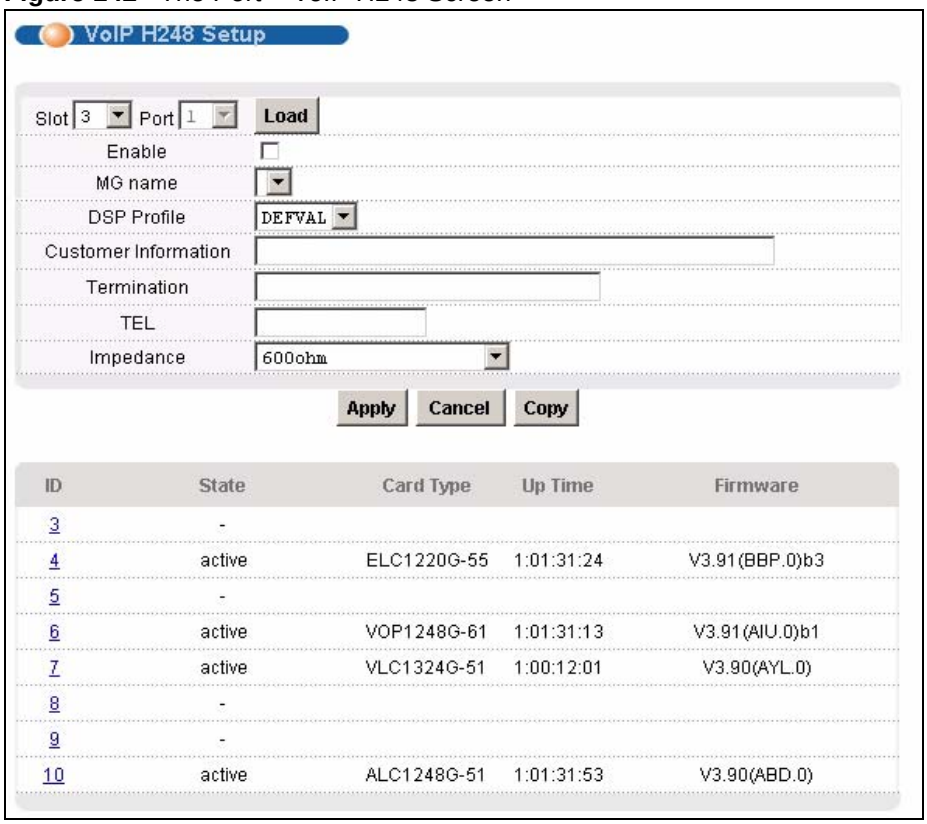
**Table 106** The Advanced Port SIP Setup Screen

| LABEL | DESCRIPTION |
|---|---|
| Impedance | This field displays the default VoIP port AC impedance. The default impedance value depends on the country code (configured in the **VoIP** > **Countrycode** screen).<br>If you do not want to use the default impedance, select the required AC impedance of the VoIP port from the drop-down list. |
| Op Mode | Set the port's VoIP operation mode.<br>Select **DEFVAL** to use SIP to connect to a server.<br>Select **v5sip** to use V5.2 to connect to a traditional class 5 POTS switch. |
| Tx / Rx Gain | **Tx**: Enter the amount of gain (increase in volume) you want to apply to the signal received from the subscriber and transmitted to the SIP server.<br>**Rx**: Enter the amount of gain (increase in volume) you want to apply to the signal received from the SIP server and transmitted to the subscriber.<br>These are measured in tenths of a decibel and the range can be from -200 to 200.<br>Enter a negative value to decrease the volume. |
| Apply | Click this to save your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click this to begin configuring the fields again. |

## 11.24 The H248 Port Setup Screen

Use this screen to manage and configure the VoIP settings of each port on your H.248 line card(s). Click **Port** > **VoIP H248**. The following screen displays.

**Figure 142** The Port > VoIP H248 Screen

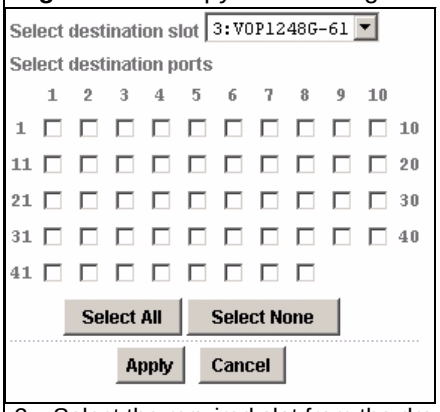



The following table describes the labels in this screen.

**Table 107** The Port > VoIP H248 Screen

| LABEL | DESCRIPTION |
|---|---|
| Slot<br>Port | Use the drop-down list boxes to select the port on an active VoIP line card you want to configure. |
| Load | Click this to display the port's current settings. |
| Enable | Select the check box to activate H.248-based VoIP on the specified port. |
| MG Name | Select the media gateway to which this port belongs. Each H.248 VoIP port must belong to one media gateway. Configure media gateways in the **VoIP** > **VoIP H248** screen. |
| DSP Profile | Select the digital sound processing profile the port is to use. If you have not configured any profiles, only the default profile **DEFVAL** can be selected. Configure DSP profiles in the **Profile** > **VoIP DSP** screen. |
| Customer Information | Enter information to identify the subscriber connected to this port. You can use up to 31 printable ASCII characters (including spaces and hyphens). |
| Termination | Enter the name for this port's H.248 Termination. By default, the port's Termination name is "termX", where X is the port number. To see a port's current Termination name, click the line card's number in the lower panel of this screen. Enter up to 31 alphanumeric characters. Spaces are not allowed. |
| TEL | This field displays the H.248 Termination name of the port. The Termination name is assigned by the media gateway controller. |

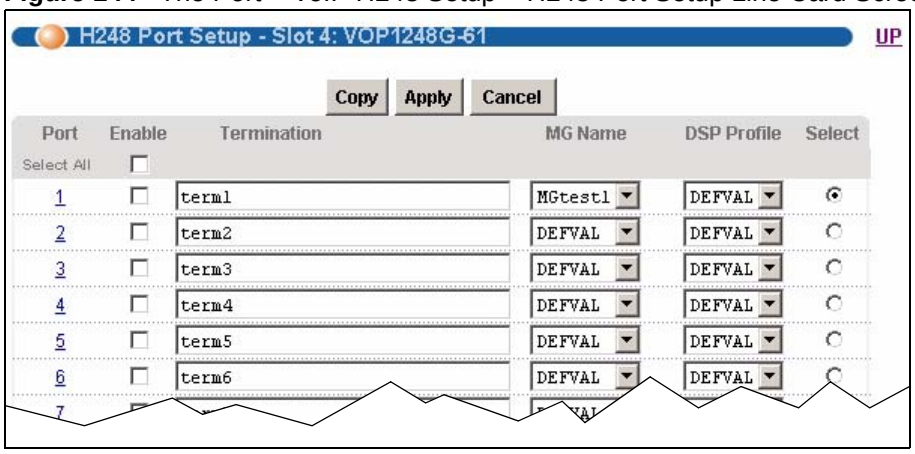
**Table 107** The Port > VoIP H248 Screen

| LABEL | DESCRIPTION |
|---|---|
| Impedance | This field displays the default VoIP port AC impedance. The default impedance value depends on the country code (configured in the **VoIP** > **Countrycode** screen).<br>If you do not want to use the default impedance, select the required AC impedance of the VoIP port from the drop-down list. |
| Apply | Click this to save your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click this to begin configuring the fields again. |
| Copy | Use this to assign a port's settings to other ports.<br>1. Click **Copy**. The following pop-up screen displays.<br>**Figure 143** Copy Port Settings<br>  <br>2. Select the required slot from the drop-down list.<br>3. Select the port(s) to which you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>4. Click **Apply** to copy the settings, or click **Cancel** to close the window without saving any changes. |
| ID | This column displays the line card's slot number. Click a H.248 line card's number to go to the card's **H.248 Port Setup Line Card** screen (see Section 11.25 on page 256) where you can see and edit all a SIP line card's VoIP configuration in a single screen. |
| State | This displays **Active** if the line card is enabled, or **-** if a line card is not enabled. |
| Card Type | This displays a line card's model name. |
| Up Time | This field displays how long the line card has been running since it was started up. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 11.25 The H.248 Port Setup Line Card Screen

Use this screen to see and edit the current VoIP configuration of each port on a H.248 VoIP line card. Click a line card's **ID** number in the **Port** > **VoIP H248** screen. The following screen displays.

**Figure 144** The Port > VoIP H248 Setup > H248 Port Setup Line Card Screen




The following table describes the labels in this screen.

**Table 108** The Port > VoIP H248 Setup > H248 Port Setup Line Card Screen

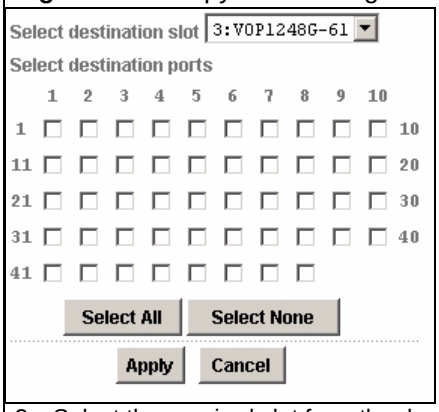
| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the **Port** > **VoIP H248** screen. |
| Copy | Use this to assign the selected port's settings to other ports.<br>1. Click **Copy**. The following pop-up screen displays.<br>**Figure 145** Copy Port Settings<br>  <br><br>2. Select the required slot from the drop-down list.<br>3. Select the port(s) to which you want to copy the settings. Use **Select All** to select every port. Use **Select None** to clear all of the check boxes.<br>4. Click **Apply** to copy the settings, or click **Cancel** to close the window without saving any changes. |
| Apply | Click this to save your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click this to begin configuring the fields again. |
| Port | These are the numbers of the line card's ports.<br>Click a port number to display the **Advanced H248 Port Setup** screen (see Section 11.26 on page 258). |
| Enable | Select a check box in this column to activate a port. Select the check box at the top of the column to activate all of the line card's ports. |

**Table 108** The Port > VoIP H248 Setup > H248 Port Setup Line Card Screen

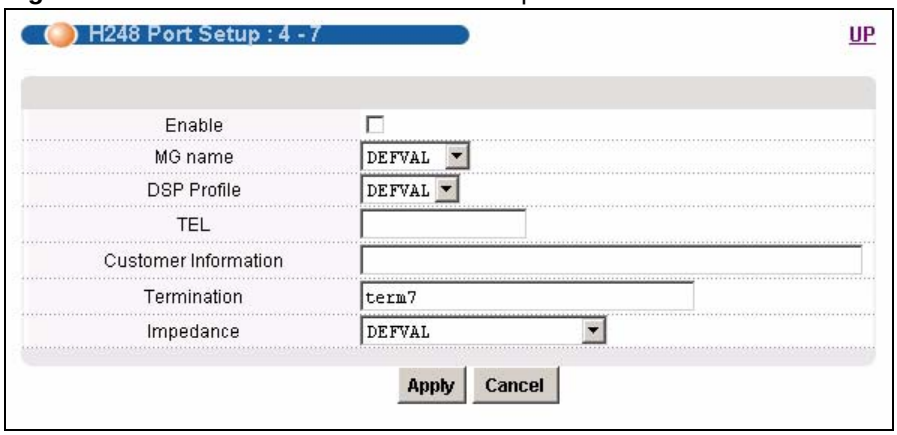
| LABEL | DESCRIPTION |
|---|---|
| Termination | Enter the name for this port's H.248 Termination. By default, the port's Termination name is "termX", where X is the port number. Enter up to 31 alphanumeric characters. Spaces are not allowed. |
| MG Name | Select the media gateway to which this port belongs. Each H.248 VoIP port must belong to one media gateway. Configure media gateways in the **VoIP** > **VoIP H248** screen. |
| DSP Profile | Select the digital signal processing profile the port is to use. If you have not configured any profiles, only the default profile **DEFVAL** can be selected. Configure DSP profiles in the **Profile** > **VoIP DSP** screen. |
| Select | Use this column to choose a port from which you want to copy settings. |

## 11.26 The Advanced H248 Port Setup Screen

Use this screen to configure the VoIP settings of a port on your H.248 VoIP line card. Click a port number in the **Port H248 Setup Line Card** screen (see Section 11.22 on page 251). The following screen displays.

The fields that display in this screen are the same as those in the **H248 Port Setup** screen (see Section 11.24 on page 254).

**Figure 146** The Advanced H248 Port Setup Screen




The following table describes the labels in this screen.

**Table 109** The Advanced H248 Port Setup Screen

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the **Port H248 Setup Line Card** screen. |
| Enable | Select the check box to activate H248-based VoIP on this port. |
| MG Name | Select the remote media gateway name. Configure remote media gateway names in the **VoIP** > **VoIP H248** screen. |

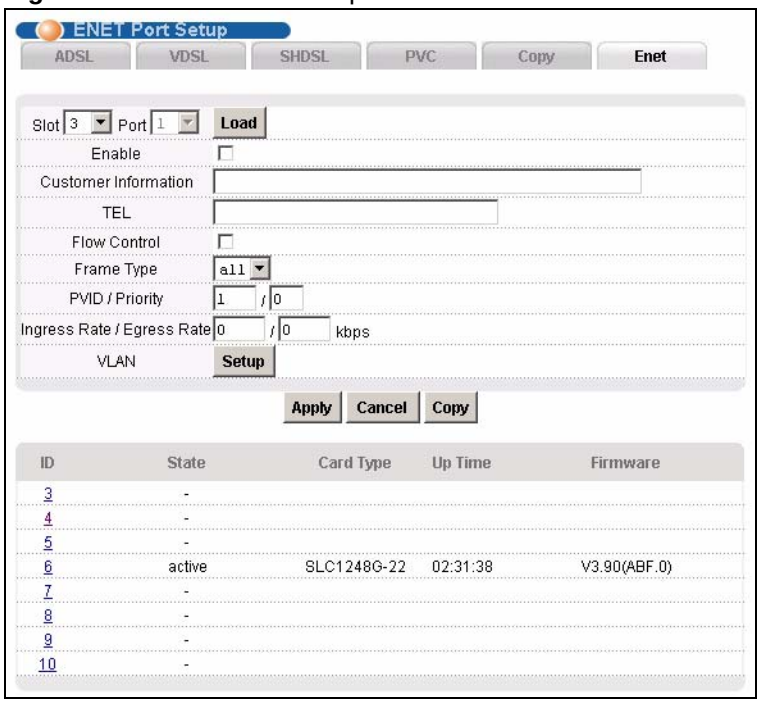
**Table 109** The Advanced H248 Port Setup Screen

| LABEL | DESCRIPTION |
|---|---|
| DSP Profile | Select the digital signal processing profile the port is to use. If you have not configured any profiles, only the default profile **DEFVAL** can be selected. Configure DSP profiles in the **Profile** > **VoIP DSP** screen. |
| TEL | This field displays the H.248 Termination name of the port. The Termination name is assigned by the media gateway controller. |
| Customer Information | Enter information to identify the subscriber connected to this port. You can use up to 31 printable ASCII characters (including spaces and hyphens). |
| Termination | Enter the name for this port's H.248 Termination. By default, the port's Termination name is "termX", where X is the port number. Enter up to 31 alphanumeric characters. Spaces are not allowed. |
| Impedance | This field displays the default VoIP port AC impedance. The default impedance value depends on the country code (configured in the **VoIP** > **Countrycode** screen).<br>If you do not want to use the default impedance, select the required AC impedance of the VoIP port from the drop-down list. |
| Apply | Click this to save your changes to the MSC1000G's volatile memory. The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click this to begin configuring the fields again. |

## 11.27 ENET Port Setup

Click **Port** > **ENET** in to open the following screen. Use this screen to configure settings for individual subscriber Ethernet ports.

**Figure 147** ENET Port Setup

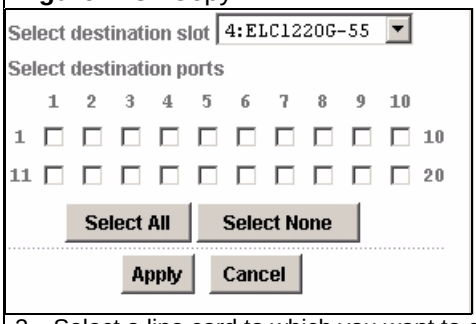


The following table describes the fields in this screen.

**Table 110** ENET Port Setup

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the number of a line card's slot. |
| Port | Select the number of a port on the line card. |
| Load | Click **Load** to display the port's settings in the fields below. |
| Enable | Select this check box to turn on this port. |
| Customer Information | Enter information to identify the subscriber connected to this port. You can use up to 31 printable English keyboard characters (including spaces and hyphens). |
| TEL | Enter information to identify the telephone number of the subscriber connected to this port. You can use up to 15 English keyboard characters (including spaces and hyphens). |
| Flow Control | Select this check box to turn on flow control on a port. See Section 14.11.2 on page 362 for more on flow control. |
| Frame Type | Select **all** to have the interface accept all Ethernet frames. Select **tag** to have the interface only accept frames with an IEEE 802.1Q VLAN tag. |
| PVID / Priority | Specify the port VLAN ID (1~4094) and IEEE 802.1p priority (0~7) to add to untagged frames received on this port.<br>If you configure an ENET PVID setting and enable TLS, the system does not apply the PVID. |
| Ingress Rate | Type a maximum bandwidth allowed for the incoming traffic flow on a port (measured in megabits per second). Use a number from 1 to 1000, or enter 0 for no limit. |
| Egress Rate | Type a maximum bandwidth allowed for the out-going traffic flow on a port (measured in megabits per second). Use a number from 1 to 1000, or enter 0 for no limit. |
| VLAN | Click the **Setup** button to open a screen where you can configure the VLAN settings for the port. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

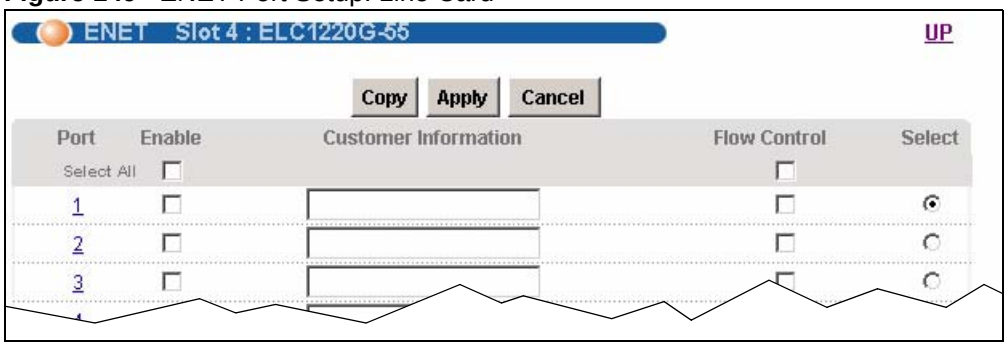
**Table 110** ENET Port Setup (continued)

| LABEL | DESCRIPTION |
|---|---|
| Copy | Do the following to copy settings from one subscriber port to another subscriber port or ports.<br>1. Use the **Slot** and **Port** drop-down list boxes and the **Load** button to select the number of the port from which you want to copy settings.<br>2. Click **Copy** to open the following screen.<br><br>**Figure 148** Copy<br>  <br>3. Select a line card to which you want to copy settings.<br>4. Select the check boxes of the ports on the line card to which you want to copy the settings. Click **Select All** to mark all of the port check boxes or click **Select None** to clear all of the port check boxes.<br>5. Click **Apply** to copy the settings to all of the ports that you have selected in this screen. Click **Cancel** to close the screen without saving changes. |
| ID | This column lists the slot numbers of the line cards. Click the ID number of an active line card to go to a screen where you can copy port settings to another port. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 11.27.1 ENET Port Setup Line Card Screen

Click **Port** > **ENET** in the navigation panel to open the **ENET Port Setup** screen. Click the slot number of an active Ethernet line card to open the following screen. Use this screen to configure settings for individual Ethernet ports and copy settings between ports.

**Figure 149** ENET Port Setup: Line Card




The following table describes the fields in this screen.

**Table 111** ENET Port Setup: Line Card

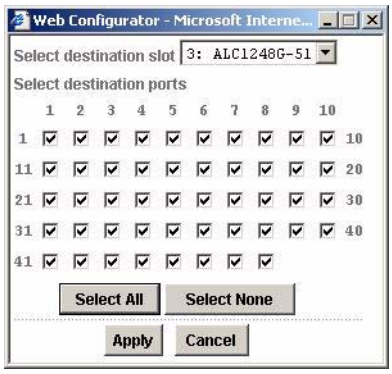
| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| Copy | Do the following to copy settings from one Ethernet port to another Ethernet port or ports.<br>1. Use the **Select** column to choose an Ethernet port from which you want to copy settings.<br>2. Click **Copy** to open the following screen.<br><br>**Figure 150** Copy<br>  <br><br>3. Select a line card to which you want to copy settings.<br>4. Select the check boxes of the ports on the line card to which you want to copy the settings. Click **Select All** to mark all of the port check boxes or click **Select None** to clear all of the port check boxes.<br>5. Click **Apply** to copy the settings to all of the ports that you have selected in this screen. Click **Cancel** to close the screen without saving changes. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| Port | These are the numbers of the subscriber ports on the line card.<br>To configure advanced port settings, click a port number to display the **ENET Port Setup** screen. |
| Enable | Select a check box in this column to turn on a port. Select the check box at the top of the column to turn on all of the line card's ports. |
| Customer Information | Enter information to identify the subscriber connected to this port. You can use up to 31 printable English keyboard characters (including spaces and hyphens). |

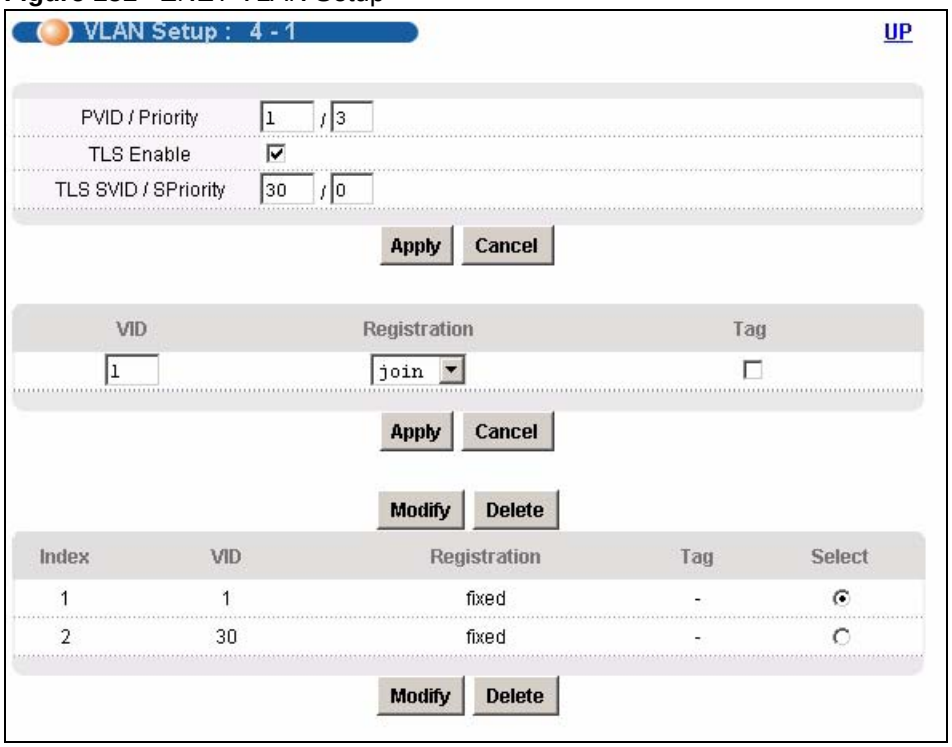
**Table 111** ENET Port Setup: Line Card (continued)

| LABEL | DESCRIPTION |
|---|---|
| Flow Control | Select this check box to turn on flow control for the port. |
| Select | Use the **Select** column to choose a port from which you want to copy settings. |

## 11.27.2 ENET VLAN Setup

Click **Port** > **ENET** in the navigation panel to open the **ENET Port Setup** screen. Select an Ethernet line card ID, a port index number and click **Setup** next to **VLAN** to open the following screen. Use this screen to add the port to VLANs (or remove it from VLANs) and configure the TLS (Transparent LAN Service) settings.

**Figure 151** ENET VLAN Setup




The following table describes the fields in this screen.

**Table 112** ENET Port Setup: VLAN Setup

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the previous screen. |
| PVID / Priority | Specify the port VLAN ID (1~4094) and IEEE 802.1p priority (0~7) to add to untagged frames received on this port. "0" is the lowest priority level and "7" is the highest. When you enable TLS, the system does not apply this PVID. |
| TLS Enable | Transparent LAN Service (also known as VLAN stacking or Q-in-Q) allows a service provider to distinguish multiple customers VLANs, even those with the same (customer-assigned) VLAN ID, within its network.<br>Once you enable TLS, all packets will be added an extra “VLAN tag” (SPVID/ Priority) and forwarded toward Gigabit Ethernet interface(s).<br>Select this option to enable TLS. Clear this check box to disable it. See Section 29.28 on page 576 for more information on TLS.<br>The system does not apply the port VID (PVID) when you enable TLS. |

**Table 112** ENET Port Setup: VLAN Setup (continued)

| LABEL | DESCRIPTION |
|---|---|
| TLS SVID / SPriority | This is the service provider's VLAN ID (the outer VLAN tag). In the first field, enter the service provider ID (from 1 to 4094) for frames received on this port.<br>In the second field, enter the priority level for the service provider's VLAN ID. "0" is the lowest priority level and "7" is the highest. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| VID | Type a VID (VLAN ID) to add this port as a member.<br>This must be the VLAN ID of a VLAN that is already configured. The port that you are configuring must also be set to the fixed status in the VLAN. |
| Registration | Select **join** to have the port be a member of the specified VLAN.<br>Select **leave** to remove the port from the specified VLAN. |
| Tag | Select the check box to tag all frames transmitted on this port with the port's VID. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |
| The table in the bottom half of the screen lists the VLANs that the port is a member of. | |
| Modify | Click **Modify** to display the selected VLAN membership entry's settings in the fields above so you can edit them. |
| Delete | Click **Delete** to remove the selected VLAN membership entry. |
| Index | This is the number of the VLAN membership entry. |
| VID | This field displays the number of a VLAN (VLAN ID) of which this port is a member. |
| Registration | This field displays "fixed" to indicate that the port is a member of the specified VLAN. |
| Tag | This field displays "V" if the line card is to tag all frames that are transmitted out on this port with this VLAN group ID. It displays "-" if the line card does not tag all frames that are transmitted out on this port with this VLAN group ID. |
| Select | Select the radio button of a VLAN membership entry and then use the **Modify** button or the **Delete** button. |

# 12

# Profile Screens

This chapter describes how to configure profiles to use in assigning settings to the DSL ports.

## 12.1 Profiles Overview

A profile is a list of settings that you define. Then you can use them to configure one or more individual ports or PVCs. You cannot delete or modify the DEFVAL profiles.

- Use ADSL profiles to configure ADSL port settings.
- Use SHDSL profiles to configure SHDSL port settings.
- Use VDSL profiles to configure VDSL port settings.
- Use ATM profiles to configure ATM traffic shaping settings to be used in configuring PVCs.
- Use alarm ADSL profiles to configure alarm settings for ADSL ports.
- Use alarm VDSL profiles to configure alarm settings for VDSL ports.
- Use alarm SHDSL profiles to configure alarm settings for SHDSL ports.
- Use IGMP filter profiles to configure IGMP filter settings for DSL ports.
- Use VoIP SIP profiles to configure VoIP SIP filter profiles for SIP-based VOP ports.
- Use VoIP SIP CALLSVC profiles to configure VoIP SIP call service filter profiles for SIP-based VOP ports.
- Use VoIP DSP profiles to configure VoIP DSP filter settings for SIP-based VOP ports.
- Use VoIP H248 profiles to configure VoIP H248 filter settings for H.248-based VOP ports.
- Use IPQoS profiles to configure IPQoS (Quality-of-Service) settings.
- Use ACL profiles to have the system classify and perform actions on the upstream traffic.
- Use dial plan profiles to set up and manage the VoIP dial plan settings for VOP ports.

## 12.2 Interleave Delay

Interleave delay is the wait (in milliseconds) that determines the size of a single block of data to be interleaved (assembled) and then transmitted. Interleave delay is used when transmission error correction (Reed- Solomon) is necessary due to a less than ideal telephone line. The bigger the delay, the bigger the data block size, allowing better error correction to be performed.

Reed-Solomon codes are block-based error correcting codes with a wide range of applications. The Reed-Solomon encoder takes a block of digital data and adds extra "redundant" bits. The Reed-Solomon decoder processes each block and attempts to correct errors and recover the original data.

### 12.2.1 Fast Mode

Fast mode means no interleaving takes place and transmission is faster (a "fast channel"). This would be suitable if you have a good line where little error correction is necessary.

## 12.3 Configured Versus Actual ADSL Rates

You configure the maximum rate of an individual ADSL port by modifying its profile (see the set profile command) or assigning the port to a different profile (see the set port command). However, due to noise and other factors on the line, the actual rate may not reach the maximum that you specify.

Even though you can specify arbitrary numbers in the set profile command, the actual rate is always a multiple of 32 Kbps for the G.dmt, ANSI T1.413 and G.lite ADSL standards or a multiple of 4 Kbps for the ADSL2 and ADSL2+ standards.

With the G.dmt, ANSI T1.413 and G.lite ADSL standards, if you enter a rate that is not a multiple of 32 Kbps, the actual rate will be the next lower multiple of 32 Kbps. For instance, if you specify 60 Kbps for a port, the actual rate for that port will not exceed 32 Kbps, and if you specify 66 Kbps, the actual rate will not be over 64 Kbps.

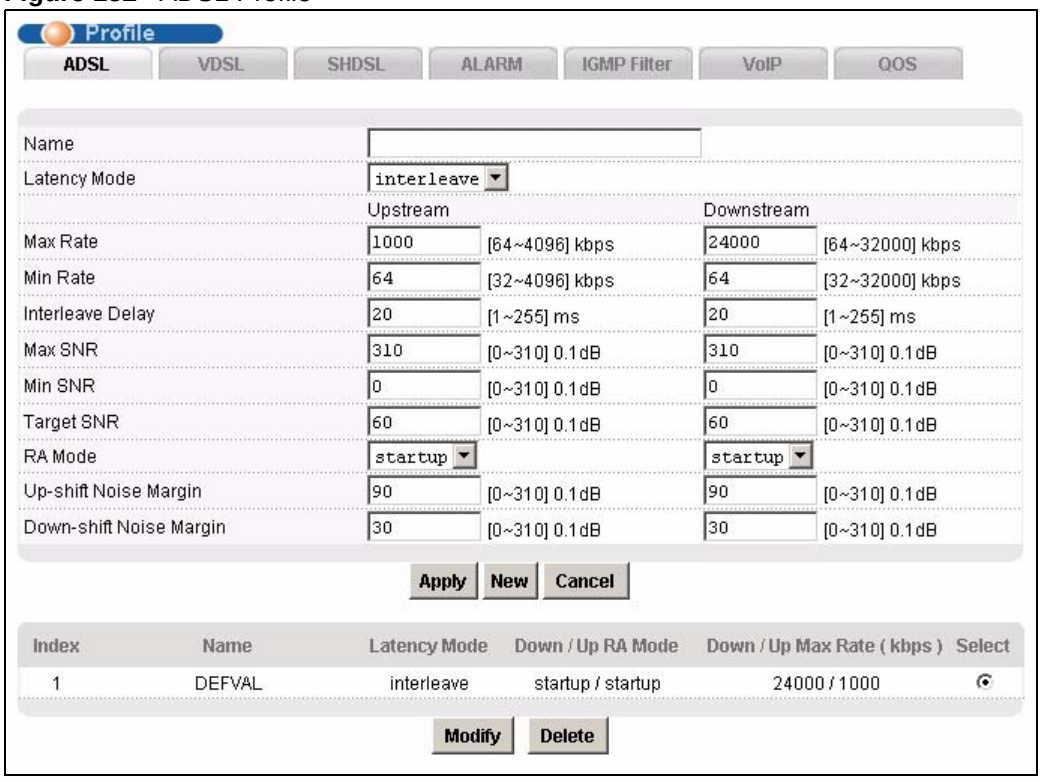
With the ADSL2 and ADSL2+ standards, if you enter a rate that is not a multiple of 4 Kbps, the actual rate will be the next lower multiple of 4 Kbps. For instance, if you specify 67 Kbps for a port, the actual rate for that port will not exceed 64 Kbps, and if you specify 69 Kbps, the actual rate will not be over 68 Kbps.

Note that when you configure an ADSL port, the upstream rate must be less than or equal to the downstream rate. Note also that the list port command displays the configured parameters of the ADSL port, while the show port command displays the actual rates.

## 12.4 ADSL Profile Screen

Click **Profile > ADSL** in the navigation panel to open the following screen. Use this screen to configure ADSL profiles. Later you can use the ADSL profiles to configure ADSL ports in the **ADSL Port Setup** screens.

**Figure 152** ADSL Profile




The following table describes the fields in this screen.

**Table 113** ADSL Profile

| LABEL | DESCRIPTION |
|---|---|
| The top part of the screen is for profile configuration. | |
| Name | When editing a profile, this is the name of this profile. When adding a profile, type a name (up to 31 characters) for the profile. |
| Latency Mode | This field sets the ADSL latency mode for the ports that belong to this profile.<br>Select **fast** mode to use no interleaving and have faster transmission (a “fast channel”). This would be suitable if you have a good line where little error correction is necessary.<br>Select **interleave** mode to use interleave delay when transmission error correction (Reed- Solomon) is necessary due to a less than ideal telephone line.<br>See Section 12.2 on page 265 for more on interleave delay. |
| Upstream | The following parameters relate to upstream transmissions. |
| Max Rate (kbps) | Type a maximum upstream transfer rate for this profile. Configure the maximum upstream transfer rate to be less than the maximum downstream transfer rate. |
| Min Rate (kbps) | Type the minimum upstream transfer rate for this port. Configure the minimum upstream transfer rate to be less than the maximum upstream transfer rate. |
| Interleave Delay (ms) | Configure this field when you set the **Latency Mode** field to **Interleave**. Type the number of milliseconds of interleave delay to use for upstream transfers. It is recommended that you configure the same latency delay for both upstream and downstream. |
| Max SNR (0.1 dB) | Type the maximum upstream signal to noise margin (measured in tenths of a decibel). |

**Table 113** ADSL Profile (continued)

| LABEL | DESCRIPTION |
|---|---|
| Min SNR (0.1 dB) | Type the minimum upstream signal to noise margin (measured in tenths of a decibel). Configure the minimum upstream signal to noise margin to be less than or equal to the maximum upstream signal to noise margin. |
| Target SNR (0.1 dB) | Type the target upstream signal to noise margin (measured in tenths of a decibel). Configure the target upstream signal to noise margin to be greater than or equal to the minimum upstream signal to noise margin and less than or equal to the maximum upstream signal to noise margin. |
| RA Mode | Select the upstream rate adaptation setting.<br>Select **fix** to not use any rate adaptation.<br>Select **startup** to use rate adaptation at initialization.<br>Select **runtime** to use rate adaptation at any time while the connection is up. |
| Up-shift Noise Margin (0.1 dB) | The upstream up shift signal to noise margin (measured in tenths of a decibel). When the channel's signal to noise margin goes above this number, the device can attempt to use a higher transfer rate. Configure the upstream up shift signal to noise margin to be greater than or equal to the target upstream signal to noise margin and less than or equal to the maximum upstream signal to noise margin. |
| Down-shift Noise Margin (0.1 dB) | The upstream down shift signal to noise margin (measured in tenths of a decibel). When the channel's signal to noise margin goes below this number, the device shifts to a lower transfer rate. Configure the upstream down shift signal to noise margin to be less than or equal to the target upstream signal to noise margin and greater than or equal to the minimum upstream signal to noise margin. |
| Downstream | The following parameters relate to downstream transmissions. |
| Max Rate (kbps) | Type a maximum downstream transfer rate for this port. Configure the maximum downstream transfer rate to be greater than the maximum upstream transfer rate. |
| Min Rate (Kbps) | Type the minimum downstream transfer rate for this port. Configure the minimum downstream transfer rate to be less than the maximum downstream transfer rate. |
| Interleave Delay (ms) | Configure this field when you set the Latency Mode field to interleave. Type the number of milliseconds of interleave delay to use for upstream transfers. It is recommended that you configure the same latency delay for both upstream and downstream. |
| Max SNR (0.1 dB) | Type the maximum downstream signal to noise margin (measured in tenths of a decibel). |
| Min SNR (0.1 dB) | Type the minimum downstream signal to noise margin (measured in tenths of a decibel). Configure the minimum downstream signal to noise margin to be less than or equal to the maximum downstream signal to noise margin. |
| Target SNR (0.1 dB) | Type the target downstream signal to noise margin (measured in tenths of a decibel). Configure the target downstream signal to noise margin to be greater than or equal to the minimum downstream signal to noise margin and less than or equal to the maximum downstream signal to noise margin. |
| RA Mode | Select the downstream rate adaptation setting.<br>Select **fix** to not use any rate adaptation.<br>Select **startup** to use rate adaptation at initialization.<br>Select **runtime** to use rate adaptation at any time while the connection is up. |
| Up-shift Noise Margin (0.1 dB) | The downstream up shift signal to noise margin (measured in tenths of a decibel). When the channel's signal to noise margin goes above this number, the device can attempt to use a higher transfer rate. Configure the downstream up shift signal to noise margin to be greater than or equal to the target downstream signal to noise margin and less than or equal to the maximum downstream signal to noise margin. |

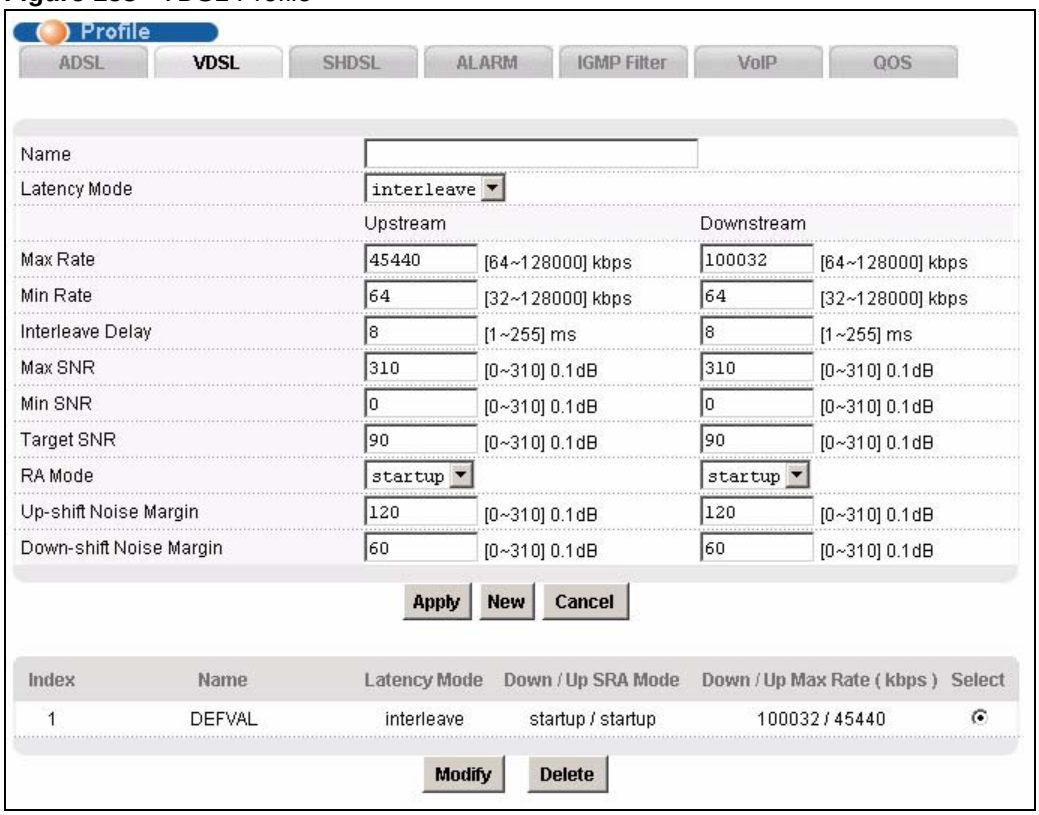
**Table 113** ADSL Profile (continued)

| LABEL | DESCRIPTION |
|---|---|
| Down-shift Noise Margin (0.1 dB) | The downstream down shift signal to noise margin (measured in tenths of a decibel). When the channel's signal to noise margin goes below this number, the device shifts to a lower transfer rate. Configure the downstream down shift signal to noise margin to be less than or equal to the target downstream signal to noise margin and greater than or equal to the minimum downstream signal to noise margin. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| The bottom part of the screen lists the configured profiles. | |
| Index | This is the port profile index number. |
| Name | These are the names of individual profiles. The DEFVAL profile always exists and all of the DSL ports have it assigned to them by default. |
| Latency Mode | This is the ADSL latency mode (**fast** or **interleave**) for the ports that belong to this profile. |
| Down/Up RA Mode | These are the downstream and upstream rate adaptation settings for the ports that belong to this profile. |
| Down/Up Max Rate (kbps) | These are the maximum downstream and upstream transfer rates for the ports that belong to this profile. |
| Modify | Select a profile's **Select** radio button and click **Modify** to edit the profile. |
| Delete | Select a profile's **Select** radio button and click **Delete** to remove the profile. |

## 12.5 VDSL Profile Setup

Click **Profile** > **VDSL** in the navigation panel to open the following screen. Use this screen to configure VDSL profiles. Later you can use the VDSL profiles to configure VDSL ports in the **VDSL Port Setup** screens.

**Figure 153** VDSL Profile




The following table describes the fields in this screen.

**Table 114** VDSL Profile

| LABEL | DESCRIPTION |
|---|---|
| The top part of the screen is for profile configuration. | |
| Name | When editing a profile, this is the name of this profile. When adding a profile, type a name (up to 31 characters) for the profile. |
| Latency Mode | This field sets the VDSL latency mode for the ports that belong to this profile.<br>Select **fast** mode to use no interleaving and have faster transmission (a “fast channel”). This would be suitable if you have a good line where little error correction is necessary.<br>Select **interleave** mode to use interleave delay when transmission error correction (Reed- Solomon) is necessary due to a less than ideal telephone line.<br>See Section 12.2 on page 265 for more on interleave delay. |
| Upstream | The following parameters relate to upstream transmissions. |
| Max Rate (kbps) | Type a maximum upstream transfer rate for this profile. Configure the maximum upstream transfer rate to be less than the maximum downstream transfer rate. |
| Min Rate (kbps) | Type the minimum upstream transfer rate for this port. Configure the minimum upstream transfer rate to be less than the maximum upstream transfer rate. |
| Interleave Delay (ms) | Configure this field when you set the **Latency Mode** field to **Interleave**. Type the number of milliseconds of interleave delay to use for upstream transfers. It is recommended that you configure the same latency delay for both upstream and downstream. |
| Max SNR (0.1 dB) | Type the maximum upstream signal to noise margin (measured in tenths of a decibel). |

**Table 114** VDSL Profile (continued)

| LABEL | DESCRIPTION |
|---|---|
| Min SNR (0.1 dB) | Type the minimum upstream signal to noise margin (measured in tenths of a decibel). Configure the minimum upstream signal to noise margin to be less than or equal to the maximum upstream signal to noise margin. |
| Target SNR (0.1 dB) | Type the target upstream signal to noise margin (measured in tenths of a decibel). Configure the target upstream signal to noise margin to be greater than or equal to the minimum upstream signal to noise margin and less than or equal to the maximum upstream signal to noise margin. |
| RA Mode | Select the upstream rate adaptation setting.<br>Select **fix** to use a fixed rate you specified in the upstream **Max Rate** field.<br>Select **startup** to use the rate negotiated at link initialization.<br>Select **runtime** to use rate adaptation at any time while the connection is up. |
| Up-shift Noise Margin | The upstream up shift signal to noise margin (measured in tenths of a decibel). When the channel's signal to noise margin goes above this number, the device can attempt to use a higher transfer rate. Configure the upstream up shift signal to noise margin to be greater than or equal to the target upstream signal to noise margin and less than or equal to the maximum upstream signal to noise margin. |
| Down-shift Noise Margin | The upstream down shift signal to noise margin (measured in tenths of a decibel). When the channel's signal to noise margin goes below this number, the device shifts to a lower transfer rate. Configure the upstream down shift signal to noise margin to be less than or equal to the target upstream signal to noise margin and greater than or equal to the minimum upstream signal to noise margin. |
| Downstream | The following parameters relate to downstream transmissions. |
| Max Rate (kbps) | Type a maximum downstream transfer rate for this port. Configure the maximum downstream transfer rate to be greater than the maximum upstream transfer rate. |
| Min Rate (Kbps) | Type the minimum downstream transfer rate for this port. Configure the minimum downstream transfer rate to be less than the maximum downstream transfer rate. |
| Interleave Delay (ms) | Configure this field when you set the Latency Mode field to interleave. Type the number of milliseconds of interleave delay to use for upstream transfers. It is recommended that you configure the same latency delay for both upstream and downstream. |
| Max SNR (0.1 dB) | Type the maximum downstream signal to noise margin (measured in tenths of a decibel). |
| Min SNR (0.1 dB) | Type the minimum downstream signal to noise margin (measured in tenths of a decibel). Configure the minimum downstream signal to noise margin to be less than or equal to the maximum downstream signal to noise margin. |
| Target SNR (0.1 dB) | Type the target downstream signal to noise margin (measured in tenths of a decibel). Configure the target downstream signal to noise margin to be greater than or equal to the minimum downstream signal to noise margin and less than or equal to the maximum downstream signal to noise margin. |
| RA Mode | Select the downstream rate adaptation setting.<br>Select **fix** to use a fixed rate you specified in the downstream **Max Rate** field.<br>Select **startup** to use the rate negotiated at link initialization.<br>Select **runtime** to use rate adaptation at any time while the connection is up. |
| Up-shift Noise Margin | The downstream up shift signal to noise margin (measured in tenths of a decibel). When the channel's signal to noise margin goes above this number, the device can attempt to use a higher transfer rate. Configure the downstream up shift signal to noise margin to be greater than or equal to the target downstream signal to noise margin and less than or equal to the maximum downstream signal to noise margin. |

**Table 114** VDSL Profile (continued)

| LABEL | DESCRIPTION |
|---|---|
| Down-shift Noise Margin | The downstream down shift signal to noise margin (measured in tenths of a decibel). When the channel's signal to noise margin goes below this number, the device shifts to a lower transfer rate. Configure the downstream down shift signal to noise margin to be less than or equal to the target downstream signal to noise margin and greater than or equal to the minimum downstream signal to noise margin. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| The bottom part of the screen lists the configured profiles. | |
| Index | This is the port profile index number. |
| Name | These are the names of individual profiles. The DEFVAL profile always exists and all of the DSL ports have it assigned to them by default. |
| Latency Mode | This is the VDSL latency mode (**fast** or **interleave**) for the ports that belong to this profile. |
| Down/Up Max Rate (kbps) | These are the maximum downstream and upstream transfer rates for the ports that belong to this profile. |
| Modify | Select a profile's **Select** radio button and click **Modify** to edit the profile. |
| Delete | Select a profile's **Select** radio button and click **Delete** to remove the profile. |

## 12.6 Configured Versus Actual SHDSL Rates

You configure the maximum and minimum rates of individual SHDSL ports using the set profile command. However, due to noise and other factors on the line, the actual rate may not reach the maximum that you specify.

Even though you can specify arbitrary numbers in the set profile command, the actual rate is always a multiple of 64 Kbps. If you enter a rate that is not a multiple of 64 Kbps, the actual value will be the next lower multiple of 64Kbps. For instance, if you specify 2100 Kbps for a port, the actual value will be 2048 Kbps, and if you specify 2120 Kbps, the actual value will be 2112 Kbps.

Note that when you configure a SHDSL profile, the upstream and downstream speeds are the same. The minimum rate must be less than or equal to the maximum rate.

## 12.7 N-wire Mode

The n-wire mode allows you to physically bundle two SHDSL ports into a single 4-wire connection. The 4-wire mode is described in ITU-T G.991.2. You can use it to connect to SHDSL modems or routers that also support 4-wire mode. N-wire mode also allows you to physically bundle four SHDSL ports into a single 8-wire connection. The 8-wire group is called mpair4.

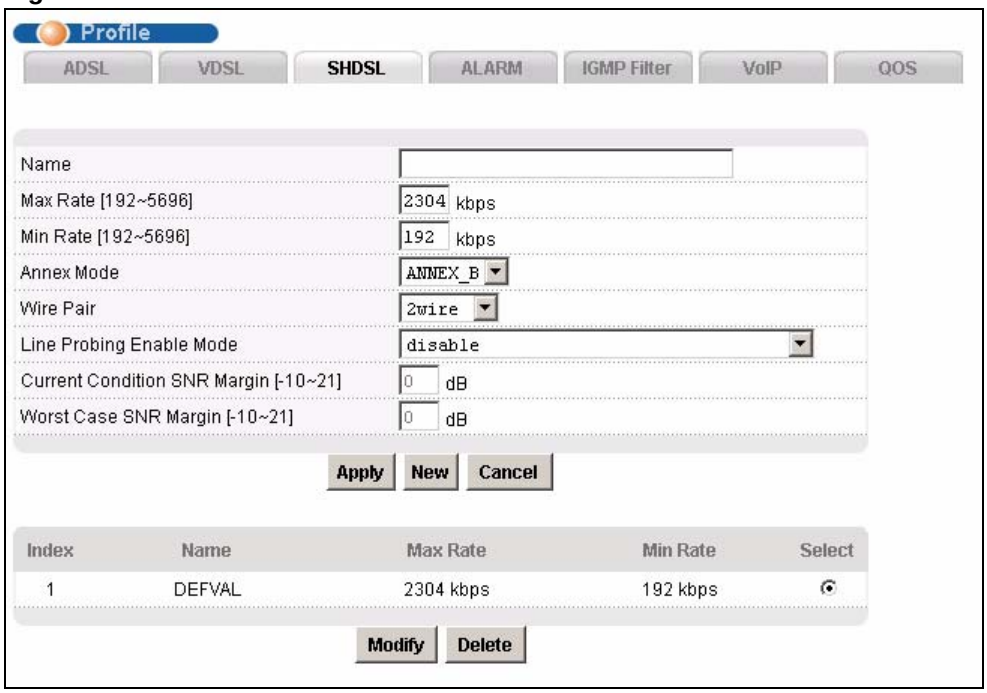
N-wire mode can increase the reach of a particular data rate without having to regenerate the signal. It can also give increased bandwidth for LAN-to-LAN applications.

You can n-wire bundle multiple groups of ports on a single SHDSL line card.

## 12.8 SHDSL Profile Screen

Click **Profile** > **SHDSL** in the navigation panel to open the following screen. Use this screen to configure SHDSL profiles. Later you can apply the SHDSL profiles to configure SHDSL ports in the **SHDSL Port Setup** screens.

**Figure 154** SHDSL Profile




The following table describes the fields in this screen.

**Table 115** SHDSL Profile

| LABEL | DESCRIPTION |
|---|---|
| The top part of the screen is for profile configuration. | |
| Name | When editing a profile, this is the name of this profile. When adding a profile, type a name (up to 31 characters) for the profile. |
| Max Rate [192~4096] kbps | Type a maximum transfer rate for this profile. |
| Min Rate [192~4096] kbps | Type the minimum upstream transfer rate for this profile. |
| Annex Mode | Select the region setting.<br>Select **ANNEX_A** to use DSL over POTS.<br>Select **ANNEX_B** to use DSL over ISDN. |

**Table 115** SHDSL Profile (continued)

| LABEL | DESCRIPTION |
|---|---|
| Wire Pair | Select a wire pair number.<br>Select **2wire** for a normal connection using a single SHDSL port's two wires, this is the default.<br>Select **4wire** for a 4-wire n-wire group (two SHDSL ports grouped together).<br>Select **mpair4** for an 8-wire n-wire group (four SHDSL ports grouped together). |
| Line Probing Enable Mode | The SHDSL line card and subscriber modem use line probes to determine the best possible transmission rate. This is used in rate adaptation.<br>Disable the line probe to have the system skip the rate adaptation phase to shorten connection set up time.<br>Select **enable (current_condition_ target_SNR)** to enable line probing using the current target Signal to Noise Ratio margin.<br>Select **enable (worst_case_target_SNR)** to enable line probing using the worst case target Signal to Noise Ratio margin. |
| Current Condition SNR Margin [-10~21] | Type the current condition target Signal to Noise Ratio margin, -10 ~ 21 in dB. You only configure this if you enable line probing using the current target Signal to Noise Ratio margin. |
| Worst Case SNR Margin [-10~21] | Type the worst case Signal to Noise Ratio margin, -10 ~ 21 in dB. You only configure this if you enable line probing using the worst case target Signal to Noise Ratio margin. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| The bottom part of the screen lists the configured profiles. | |
| Index | This is the port profile index number. |
| Name | These are the names of individual profiles. The DEFVAL profile always exists and all of the DSL ports have it assigned to them by default. |
| Max Rate (kbps) | This is the maximum transfer rate (in Kbps) for this profile. |
| Min Rate (kbps) | This is the minimum upstream transfer rate (in Kbps) for this profile. |
| Modify | Select a profile's **Select** radio button and click **Modify** to edit the profile. |
| Delete | Select a profile's **Select** radio button and click **Delete** to remove the profile. |

## 12.9 ATM QoS

ATM Quality of Service (QoS) mechanisms provide the best service on a per-flow guarantee. ATM network infrastructure was designed to provide QoS. It uses fixed cell sizes and built-in traffic management (see the following section on traffic shaping). This allows you to fine-tune the levels of services on the priority of the traffic flow.

# 12.10 Traffic Shaping

Traffic shaping is an agreement between the carrier and the subscriber to regulate the average rate and fluctuations of data transmission over an ATM network. This agreement helps eliminate congestion, which is important for transmission of real time data such as audio and video connections.

Traffic shaping controls outgoing (downstream) traffic, not incoming (upstream).

## 12.10.1 ATM Traffic Classes

These are the basic ATM traffic classes defined by the ATM Forum Traffic Management 4.0 Specification.

### 12.10.1.1 Constant Bit Rate (CBR)

Constant Bit Rate (CBR) is an ATM traffic class that provides fixed bandwidth. CBR traffic is generally time-sensitive (doesn't tolerate delay). CBR is used for connections that continuously require a specific amount of bandwidth. Examples of connections that need CBR would be high-resolution video and voice.

### 12.10.1.2 Variable Bit Rate (VBR)

The Variable Bit Rate (VBR) ATM traffic class is used with bursty connections. Connections that use the Variable Bit Rate (VBR) traffic class can be grouped into real time (rt-VBR) or non-real time (nrt-VBR) connections.

The rt-VBR (real-time Variable Bit Rate) type is used with bursty connections that require closely controlled delay and delay variation. An example of an rt-VBR connection would be video conferencing. Video conferencing requires real-time data transfers and the bandwidth requirement varies in proportion to the video image's changing dynamics.

The nrt-VBR (non real-time Variable Bit Rate) type is used with bursty connections that do not require closely controlled delay and delay variation. An example of an nrt-VBR connection would be non-time sensitive data file transfers.

### 12.10.1.3 Unspecified Bit Rate (UBR)

The Unspecified Bit Rate (UBR) ATM traffic class is similar to the ABR traffic class for bursty data transfers. However, while ABR gives subscribers a set amount of bandwidth, UBR doesn't guarantee any bandwidth and only delivers traffic when the network has spare bandwidth.

## 12.10.2 Traffic Parameters

These are the parameters that control the flow of ATM traffic.

#### 12.10.2.1 Peak Cell Rate (PCR)

Peak Cell Rate (PCR) is the maximum rate at which the sender can send cells. This parameter may be lower (but not higher) than the maximum line speed. 1 ATM cell is 53 bytes (424 bits), so a maximum speed of 832Kbps gives a maximum PCR of 1962 cells/sec. This rate is not guaranteed because it is dependent on the line speed.

#### 12.10.2.2 Sustained Cell Rate (SCR)

Sustained Cell Rate (SCR) is the mean cell rate of each bursty traffic source. It specifies the maximum average rate at which cells can be sent over the virtual connection. SCR may not be greater than the PCR.

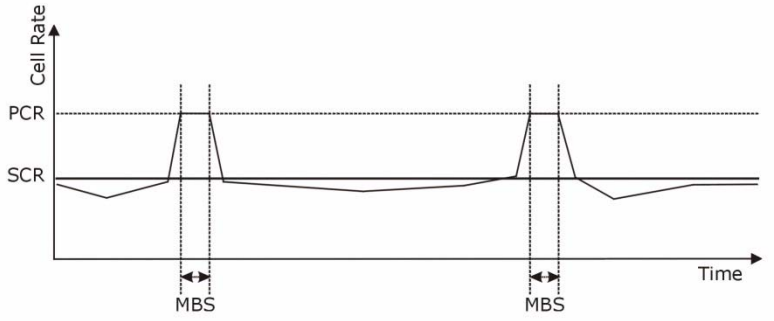
#### 12.10.2.3 Maximum Burst Size (MBS)

Maximum Burst Size (MBS) is the maximum number of cells that can be sent at the PCR. After MBS is reached, cell rates fall below SCR until cell rate averages to the SCR again. At this time, more cells (up to the MBS) can be sent at the PCR again.

If the PCR, SCR or MBS is set to the default of "0", the system will assign a maximum value that correlates to your upstream line rate.

The following figure illustrates the relationship between PCR, SCR and MBS.

**Figure 155** PCR, SCR and MBS in Traffic Shaping




#### 12.10.2.4 Cell Delay Variation Tolerance (CDVT)

Cell Delay Variation Tolerance (CDVT) is the accepted tolerance of the difference between a cell's transfer delay and the expected transfer delay. CDVT controls the time scale over which the PCR is enforced. CDVT is used to determine if a cell arrived too early in relation to PCR.

#### 12.10.2.5 Burst Tolerance (BT)

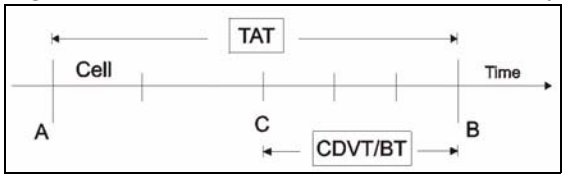
Burst Tolerance (BT) is the maximum number of cells that the port is guaranteed to handle without any discards. BT controls the time scale over which the SCR is enforced. BT is used to determine if a cell arrived too early in relation to SCR. Use this formula to calculate BT: (MBS - 1) x (1 / SCR - 1 / PCR) = BT.

#### 12.10.2.6 Theoretical Arrival Time (TAT)

The Theoretical Arrival Time (TAT) is when the next cell (in an ATM connection's stream of cells) is expected to arrive. TAT is calculated based on the PCR or SCR.

The following figure illustrates the relationship between TAT, CDVT and BT. If a cell arrives at time A, then according to PCR or SCR, the next cell is expected to arrive at time B. If the next cell arrives earlier than time C, it is discarded or tagged for not complying with the TAT. Time C is calculated based on the CDVT or BT.

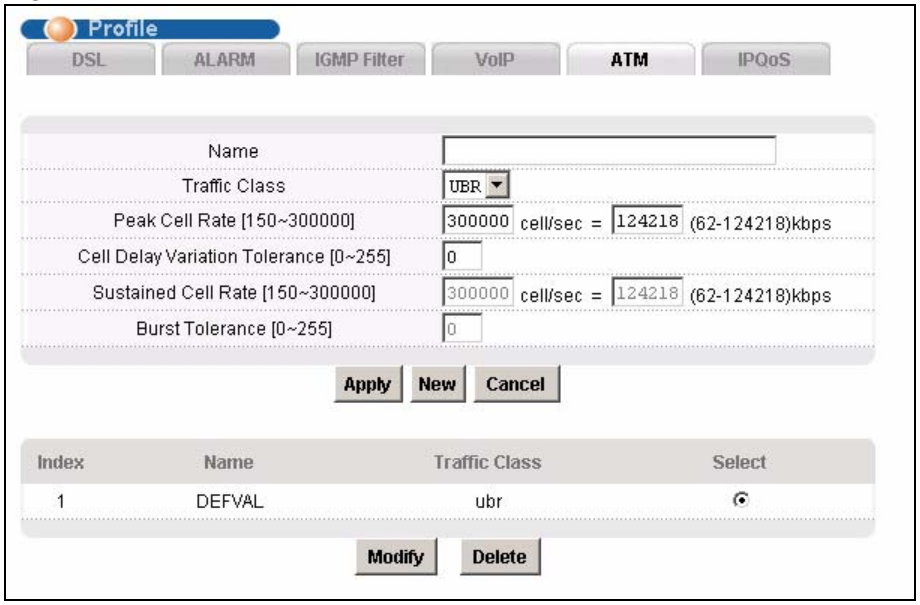
**Figure 156** TAT, CDVT and BT in Traffic Shaping




## 12.11 ATM Profile Screen

Click **Profile** > **ATM** in the navigation panel to open the following screen. Use this screen to configure ATM profiles. Later you can use the ATM profiles to configure PVCs in the **PVC Setup** screens.

**Figure 157** ATM Profile




The following table describes the fields in this screen.

**Table 116** ATM Profile

| LABEL | DESCRIPTION |
|---|---|
| The top part of the screen is for profile configuration. | |
| Name | When editing a profile, this is the name of this profile. When adding a profile, type a name for the profile. You can use up to 31 English keyboard characters; spaces are not allowed. |

**Table 116** ATM Profile (continued)

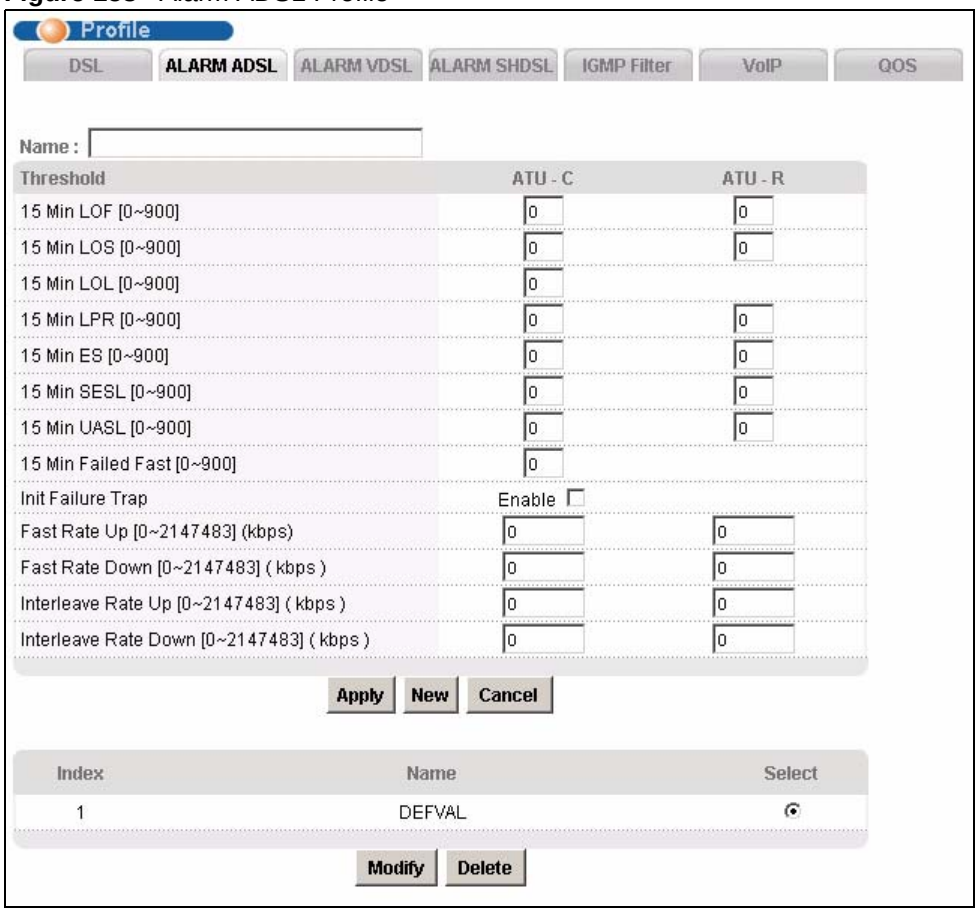
| LABEL | DESCRIPTION |
|---|---|
| Traffic Class | Select **CBR** (constant bit rate) to specify fixed (always-on) bandwidth for voice or data traffic.<br>Select **UBR** (unspecified bit rate) for applications that are non-time sensitive, such as e-mail.<br>Select **VBR** (real time variable bit rate) or **NRT** (non real time variable bit rate) for bursty traffic and bandwidth sharing with other applications. |
| Peak Cell Rate [150~300000] | The Peak Cell Rate is the maximum rate at which the sender can send cells. Peak Cell Rate applies with all of the ATM traffic classes. You can type a number of (ATM) cells per second in the first field or type a number of kilobytes per second in the second field to have the system automatically compute the number of ATM cells per second. |
| Cell Delay Variation Tolerance [0~255] | Cell Delay Variation Tolerance is the accepted tolerance of the difference between a cell's transfer delay and the expected transfer delay. Cell Delay Variation Tolerance applies with all of the ATM traffic classes. Type the Cell Delay Variation Tolerance here. |
| Sustained Cell Rate [150~300000] | The Sustained Cell Rate sets the average cell rate (long-term) that can be transmitted. Type the Sustained Cell Rate, which must be less than the Peak Cell Rate. Sustained Cell Rate applies with the variable bit rate traffic classes. You can type a number of (ATM) cells per second in the first field or type a number of kilobytes per second in the second field to have the system automatically compute the number of ATM cells per second. |
| Burst Tolerance [0~255] | Burst Tolerance sets a maximum number of cells that the port is guaranteed to handle without any discards. Type the Burst Tolerance here. Burst Tolerance applies with the variable bit rate traffic classes. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| The bottom part of the screen lists the configured profiles. | |
| Index | This is the number of the ATM profile. |
| Name | This name identifies the ATM profile. |
| Traffic Class | This field displays the type of ATM traffic class: **cbr** (constant bit rate), **vbr** (real-time variable bit rate), **nrt** (non-real time variable bit rate) or **ubr** (unspecified bit rate). |
| Modify | Select a profile's **Select** radio button and click **Modify** to edit the profile. |
| Delete | Select a profile's **Select** radio button and click **Delete** to remove the profile. |

## 12.12 Alarm ADSL Profile Screen

Click **Profile> Alarm ADSL** in the navigation panel to open the following screen. Use this screen to configure alarm profiles for the ADSL ports. Later you can apply the alarm ADSL profiles to ADSL ports in the **ADSL Port Setup** screens.

Alarm ADSL profiles define ADSL port alarm thresholds. The system sends an alarm trap and generates a syslog entry when the thresholds of the alarm profile are exceeded.

**Figure 158** Alarm ADSL Profile




The following table describes the fields in this screen.

**Table 117** Alarm ADSL Profile

| LABEL | DESCRIPTION |
|---|---|
| The top part of the screen is for profile configuration. | |
| Name | Type a name to identify the alarm profile (you cannot change the name of the DEFVAL profile). You can use up to 31 English keyboard characters; spaces are not allowed. |
| Threshold | Specify limits for the individual performance counters. The system sends an alarm trap and generates a syslog entry when one of these thresholds is exceeded. A value of 0 disables the alarm threshold. |
| ATU-C | These fields are for traffic coming from the subscriber's device to the system. |
| ATU-R | These fields are for traffic going from the system to the subscriber's device. |
| 15 Min LOF [0~900] | This field sets the limit for the number of Loss Of Frame seconds that are permitted to occur within 15 minutes. |
| 15 Min LOS [0~900] | This field sets the limit for the number of Loss Of Signal seconds that are permitted to occur within 15 minutes. |
| 15 Min LOL [0~900] | This field sets limit for the number of Loss Of Link seconds that are permitted to occur within 15 minutes. |
| 15 Min LPR [0~900] | This field sets the limit for the number of Loss of Power (on the ATUR) seconds that are permitted to occur within 15 minutes. |
| 15 Min ES [0~900] | This field sets the limit for the number of Errored Seconds that are permitted to occur within 15 minutes. |

**Table 117** Alarm ADSL Profile (continued)

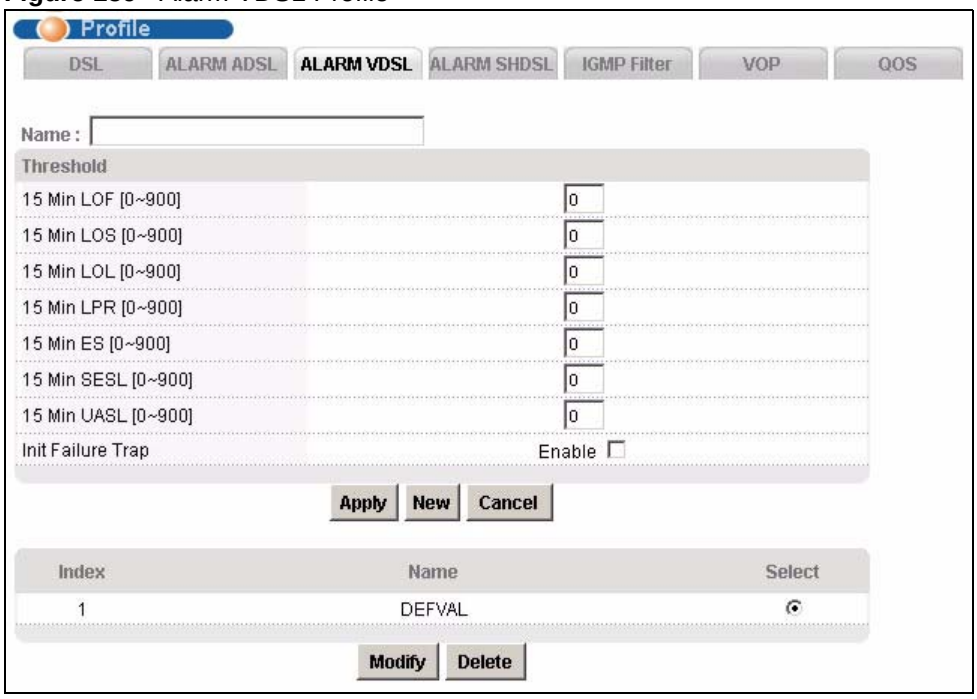
| LABEL | DESCRIPTION |
|---|---|
| 15 Min SESL [0~900] | This field sets the limit for the number of Severely Errored Seconds that are permitted to occur within 15 minutes. |
| 15 Min UASL [0~900] | This field sets the limit for the number of UnAvailable Seconds that are permitted to occur within 15 minutes. |
| 15 Min Failed Fast [0~900] | This field sets the limit for the number of failed fast retrain seconds that are permitted to occur within 15 minutes. |
| Init Failure Trap | Select **Enable** to trigger an alarm for an initialization failure trap. |
| Fast Rate Up [0~2147483] (kbps) | Specify a rate in kilobits per second (kbps). If a fast mode connection's upstream transmission rate increases by more than this number, then a trap is sent. |
| Fast Rate Down [0~2147483] (kbps) | Specify a rate in kilobits per second (kbps). If a fast mode connection's downstream transmission rate decreases by more than this number, then a trap is sent. |
| Interleave Rate Up [0~2147483] (kbps) | Specify a rate in kilobits per second (kbps). If an interleave mode connection's upstream transmission rate increases by more than this number, then a trap is sent. |
| Interleave Rate Down [0~2147483] (kbps) | Specify a rate in kilobits per second (kbps). If an interleave mode connection's upstream transmission rate decreases by more than this number, then a trap is sent. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| The bottom part of the screen lists the configured profiles. | |
| Index | This is the index number of the alarm profile. |
| Name | This is the name of the alarm profile. |
| Modify | Select a profile's **Select** radio button and click **Modify** to edit the profile. |
| Delete | Select a profile's **Select** radio button and click **Delete** to remove the profile. |

## 12.13 Alarm VDSL Profile Screen

Click **Profile**> **Alarm VDSL** in the navigation panel to open the following screen. Use this screen to configure alarm profiles for the VDSL ports. Later you can apply the alarm VDSL profiles to VDSL ports in the **VDSL Port Setup** screens.

Alarm VDSL profiles define VDSL port alarm thresholds. The system sends an alarm trap and generates a syslog entry when the thresholds of the alarm profile are exceeded.

**Figure 159** Alarm VDSL Profile




The following table describes the fields in this screen.

**Table 118** Alarm VDSL Profile

| LABEL | DESCRIPTION |
|---|---|
| The top part of the screen is for profile configuration. | |
| Name | Type a name to identify the alarm profile (you cannot change the name of the DEFVAL profile). You can use up to 31 English keyboard characters; spaces are not allowed. |
| Threshold | Specify limits for the individual performance counters. The system sends an alarm trap and generates a syslog entry when one of these thresholds is exceeded. A value of 0 disables the alarm threshold. |
| 15 Min LOF [0~900] | This field sets the limit for the number of Loss Of Frame seconds that are permitted to occur within 15 minutes. |
| 15 Min LOS [0~900] | This field sets the limit for the number of Loss Of Signal seconds that are permitted to occur within 15 minutes. |
| 15 Min LOL [0~900] | This field sets limit for the number of Loss Of Link seconds that are permitted to occur within 15 minutes. |
| 15 Min LPR [0~900] | This field sets the limit for the number of Loss of Power (on the ATUR) seconds that are permitted to occur within 15 minutes. |
| 15 Min ES [0~900] | This field sets the limit for the number of Errored Seconds that are permitted to occur within 15 minutes. |
| 15 Min SESL [0~900] | This field sets the limit for the number of Severely Errored Seconds that are permitted to occur within 15 minutes. |
| 15 Min UASL [0~900] | This field sets the limit for the number of UnAvailable Seconds that are permitted to occur within 15 minutes. |
| 15 Min Failed Fast [0~900] | This field sets the limit for the number of failed fast retrain seconds that are permitted to occur within 15 minutes. |
| Init Failure Trap | Select **Enable** to trigger an alarm for an initialization failure trap. |

**Table 118** Alarm VDSL Profile (continued)

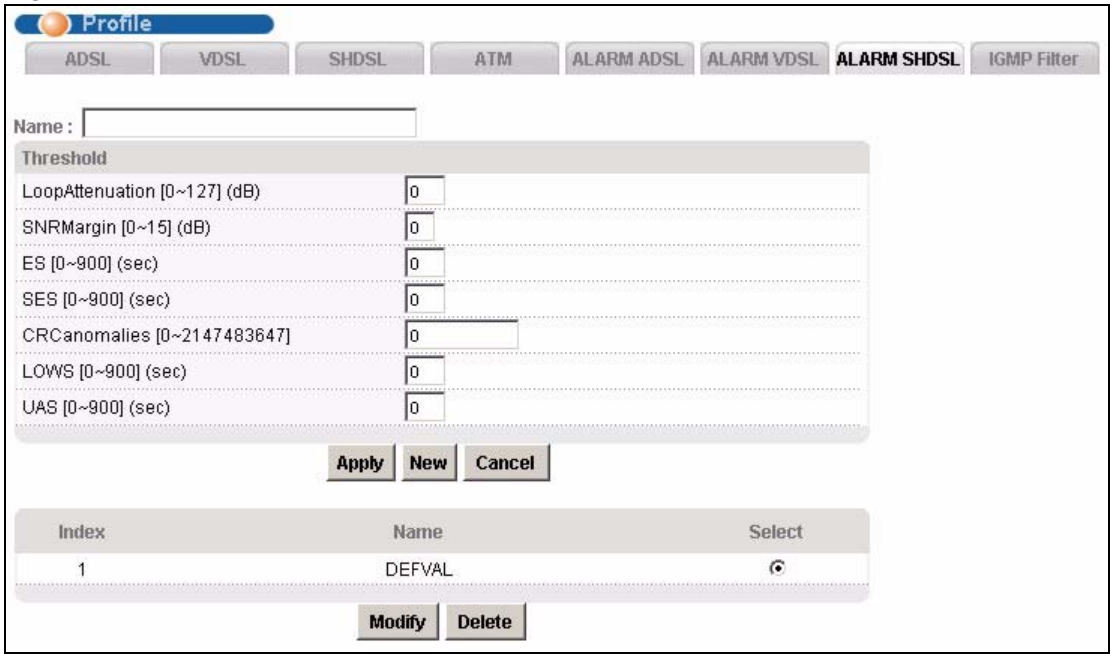
| LABEL | DESCRIPTION |
|---|---|
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| The bottom part of the screen lists the configured profiles. | |
| Index | This is the index number of the alarm profile. |
| Name | This is the name of the alarm profile. |
| Modify | Select a profile's **Select** radio button and click **Modify** to edit the profile. |
| Delete | Select a profile's **Select** radio button and click **Delete** to remove the profile. |

## 12.14 Alarm SHDSL Profile Screen

Click **Profile**> **Alarm SHDSL** in the navigation panel to open the following screen. Use this screen to configure alarm profiles for the SHDSL ports. Later you can apply the alarm SHDSL profiles to SHDSL ports in the **SHDSL Port Setup** screens.

Alarm SHDSL profiles define SHDSL port alarm thresholds. The system sends an alarm trap and generates a syslog entry when the thresholds of the alarm profile are exceeded.

**Figure 160** Alarm SHDSL Profile




The following table describes the fields in this screen.

**Table 119** Alarm SHDSL Profile

| LABEL | DESCRIPTION |
|---|---|
| The top part of the screen is for profile configuration. | |
| Name | Type a name to identify the alarm profile (you cannot change the name of the DEFVAL profile). You can use up to 31 English keyboard characters; spaces are not allowed. |
| Threshold | Specify limits for the individual performance counters. The system sends an alarm trap and generates a syslog entry when one of these thresholds is exceeded. A value of 0 disables the alarm threshold. |
| LoopAttenuation [0~127] (dB) | The permitted attenuation (reduction of signal amplitude) of a port's connection. |
| SNRMargin [0~15] (dB) | The permitted signal to noise ratio margin. |
| ES [0~900] (sec) | The number of Errored Seconds (0~900) that are permitted to occur within 15 minutes. |
| SES [0~900] (sec) | The number of Severely Errored Seconds (0~900) that are permitted to occur within 15 minutes. |
| CRCanomalies [0~2147483647] | The number of Cyclic Redundancy Checking anomalies that are permitted to occur within 15 minutes. |
| LOWS [0~900] (sec) | The number of Loss Of Sync Word Seconds (0~900) that are permitted to occur within 15 minutes. |
| UAS [0~900] | The number of UnAvailable Seconds (0~900) that are permitted to occur within 15 minutes. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| The bottom part of the screen lists the configured profiles. | |
| Index | This is the index number of the alarm profile. |
| Name | This is the name of the alarm profile. |
| Modify | Select a profile's **Select** radio button and click **Modify** to edit the profile. |
| Delete | Select a profile's **Select** radio button and click **Delete** to remove the profile. |

## 12.15 IGMP Filter Profile Screen

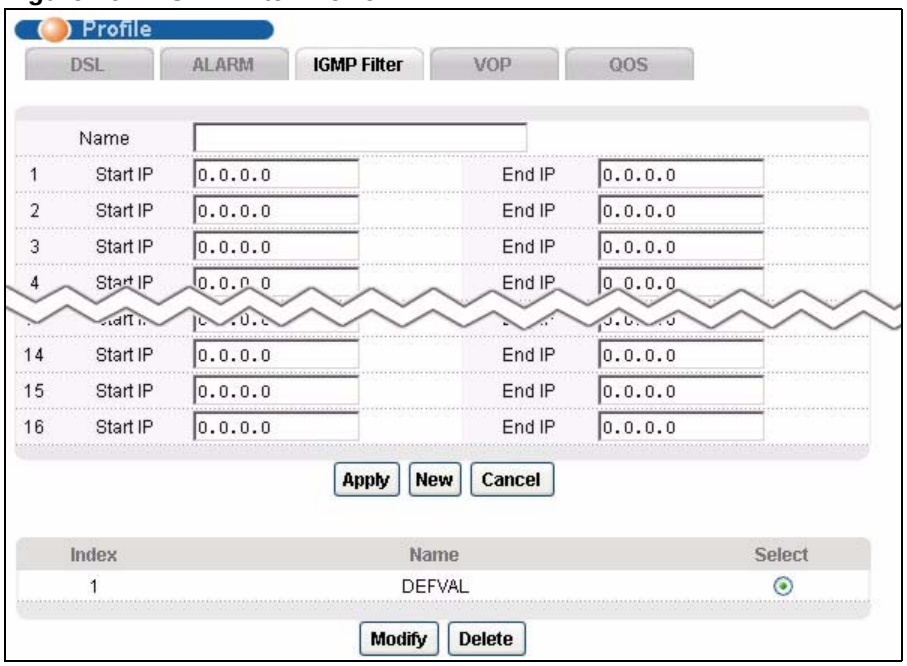
You can use the IGMP filter profiles to control access to a service that uses a specific multicast group (like a SIP server for example). Configure an IGMP filter profile that allows access to that multicast group. Then assign the IGMP filter profile to ADSL ports that are allowed to use the service.

Click **Profile** > **IGMP Filter** in the navigation panel to open the following screen. Use this screen to configure IGMP filter profiles. Later you can apply the IGMP filter profiles to ADSL ports in the **ADSL Port Setup** screens.

The **DEFVAL** IGMP filter profile is assigned to all ADSL ports by default. It allows a port to join all multicast IP addresses (224.0.0.0~239.255.255.255). If you want to allow an ADSL subscriber access to only specific IGMP multicast groups, use the **IGMP Filter Profile** screen to configure a different profile and then assign it to the subscriber's ADSL port in the **ADSL Port Setting** screens.

Use the top part of the screen to add or edit IGMP filter profiles. The bottom of the screen lists the configured IGMP filter profiles.

**Figure 161** IGMP Filter Profile




The following table describes the fields in this screen.

**Table 120** IGMP Filter Profile

| LABEL | DESCRIPTION |
|---|---|
| Name | Type a name to identify the IGMP filter profile (you cannot change the name of the DEFVAL profile). You can use up to 31 English keyboard characters; spaces are not allowed. |
| Start IP | Enter the starting multicast IP address for a range of multicast IP addresses to which you want this IGMP filter profile to allow access. |
| End IP | Enter the ending multicast IP address for a range of IP addresses to which you want this IGMP filter profile to allow access.If you want to add a single multicast IP address, enter it in both the **Start IP** and **End IP** fields. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Index | This is the index number of the IGMP profile. |
| Name | This is the name of the IGMP profile. |

**Table 120** IGMP Filter Profile (continued)

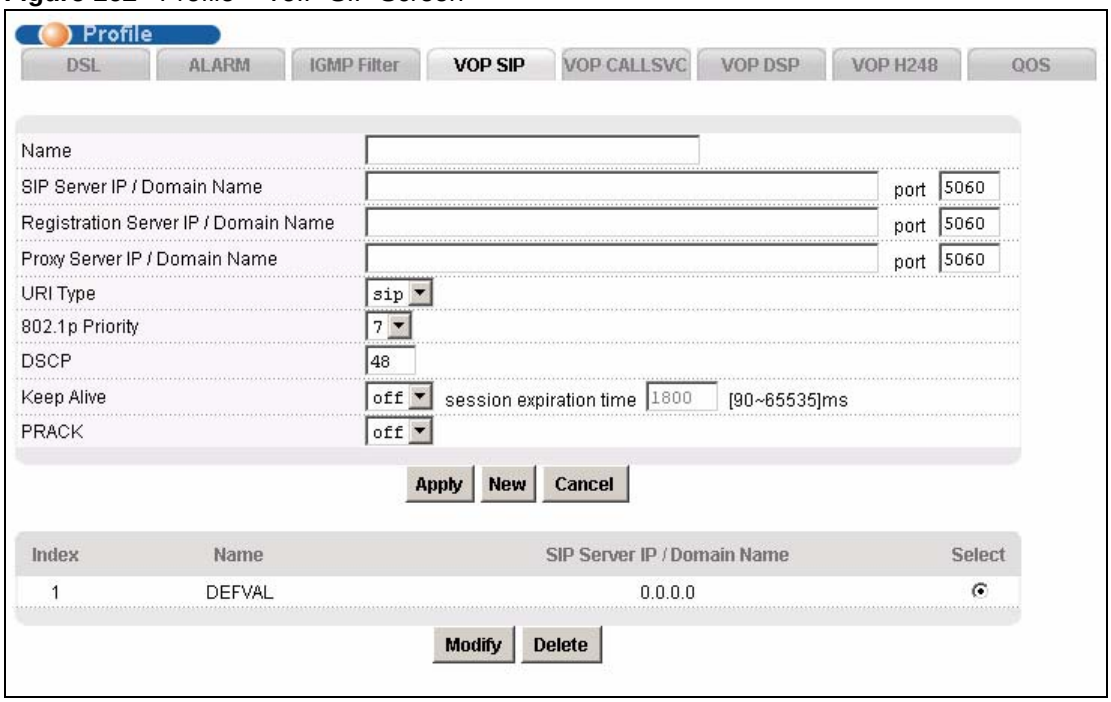
| LABEL | DESCRIPTION |
|---|---|
| Modify | Select a profile's **Select** radio button and click **Modify** to edit the profile. |
| Delete | Select a profile's **Select** radio button and click **Delete** to remove the profile. |

## 12.16 The Profile VoIP SIP Screen

Use this screen to configure basic information about the SIP accounts used by the VOP line cards. You can then select a set of SIP account information (known as a profile) and assign it to a port in the **Port** > **VoIP SIP** screen.

Click **Profile** > **VoIP SIP**. The following screen displays.

**Figure 162** Profile > VoIP SIP Screen




The following table describes the labels in this screen.

**Table 121** Profile > VoIP SIP Screen

| LABEL | DESCRIPTION |
|---|---|
| Name | Enter a descriptive name for this SIP profile (up to 31 ASCII characters; spaces are not allowed). |
| SIP Server IP / Domain Name | Enter the IP address or domain name of your VoIP provider's SIP server. You can use up to 64 printable ASCII characters. It does not matter whether the SIP server is a proxy, redirect or register server. |
| Port | Enter the SIP server's listening port number, if the VoIP service provider gave you one. Otherwise, keep the default value. |
| Registration Server IP / Domain Name | Enter the IP address or domain name of the SIP registrar server, if the VoIP service provider gave you one. Otherwise, enter the same address you entered in the **SIP IP / Domain Name** field. You can use up to 64 printable ASCII characters. |

**Table 121** Profile > VoIP SIP Screen

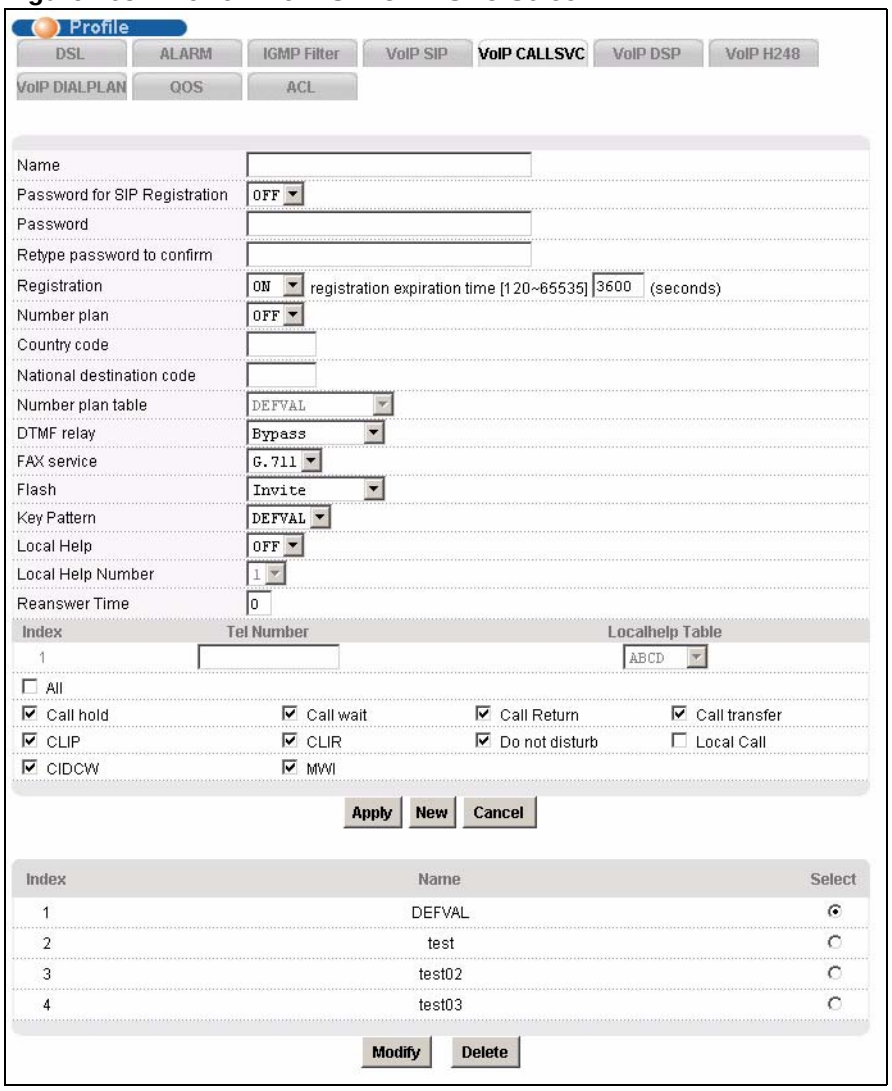
| LABEL | DESCRIPTION |
|---|---|
| Port | Enter the SIP registrar server's listening port number, if the VoIP service provider gave you one. Otherwise, enter the same port number you entered in the **SIP IP / Domain Name Port** field. |
| Proxy Server IP / Domain Name | Enter the IP address or domain name of the SIP server or outbound proxy SIP server (if supplied by your VoIP service provider).<br>The system uses this address to communicate with the SIP server. |
| Port | Enter the SIP outbound server's listening port number, if the service provider gave you one. Otherwise, enter the same port number you entered in the **SIP IP / Domain Name Port** field. |
| URI Type | Use this to configure how Universal Resource Indicators (URIs) are sent.<br>Select **SIP** where SIP messages are sent to a domain name or IP address.<br>Select **TEL** where SIP messages are sent to addresses represented as telephone numbers. |
| 802.1p Priority | Set the IEEE 802.1p priority value for SIP and RTP traffic using this SIP profile. |
| DSCP | Set the DiffServ Code Point (DSCP) value for SIP and RTP traffic using this SIP profile. |
| Keep Alive | Turn SIP session keepalive on or off. When this is on, the SIP UA periodically sends SIP session refresh requests. |
| Session Expiration Time | Enter the minimum number of seconds after which the system tears down the session (if no successful session refresh has occurred). |
| PRACK | Sets whether the system sends provisional acknowledgment messages (**ON**), or does not send them (**OFF**). |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| The bottom part of the screen lists the configured profiles. | |
| Index | This is the port profile index number. |
| Name | These are the names of individual profiles. The DEFVAL profile always exists, and is assigned to all ports by default. |
| Sip Server IP / Domain Name | This displays the IP address or domain name of your VoIP provider's SIP server. |
| Modify | Select a profile's **Select** radio button and click **Modify** to edit the profile. |
| Delete | Select a profile's **Select** radio button and click **Delete** to remove the profile. |

# 12.17 Profile VoIP SIP Call Service Screen

Use this screen to configure the call service information used by the system. You can then select a set of call service information (known as a profile) and assign it to a port in the **Port** > **VoIP SIP** screen.

Click **Profile** > **VoIP SIP CALLSVC**. The following screen displays.

**Figure 163** Profile > VoIP SIP CALLSVC Screen




The following table describes the labels in this screen.

**Table 122** Profile > VoIP SIP CALLSVC Screen

| LABEL | DESCRIPTION |
|---|---|
| Name | Enter a name for this call service profile (up to 31 ASCII characters; spaces are not allowed). |
| Password for SIP Registration | Select **OFF** if the SIP account this profile uses does not require a password for user authentication.<br>Select **ON** if the SIP account this profile uses requires a password for user authentication. |

**Table 122** Profile > VoIP SIP CALLSVC Screen

| LABEL | DESCRIPTION |
|---|---|
| Password | If you selected **ON** in the **Password for SIP Registration** field, enter the password for this user here. |
| Retype password to confirm | Re-enter the password. |
| Registration | Select **ON** if the SIP account requires registration. Select **OFF** if the SIP account does not require registration. |
| Number Plan | Select **ON** to use the number plan table specified in the **Number Plan Table** field.<br>Select **OFF** to use no number plan table. |
| Countrycode | Enter the numeric code for the country of operation. This value is used by the number plan table's "\c" function (see Section 17.8 on page 424). |
| National Destination Code | Enter the numeric code for the region of operation. This value is used by the number plan table's "\d" function (see Section 17.8 on page 424). |
| Number Plan Table | Select the number plan you want to use for this call service profile. Configure number plans in the **VoIP** > **Number Plan Table** screens. |
| DTMF Relay | Choose the method of relaying DTMF (Dual-Tone Multi-Frequency) tones configured on the peer device.<br>Select **Bypass** to not relay DTMF tones.<br>Select **RFC2833** to relay DTMF tones according to RFC 2833.<br>Select **RFC2833 Like** to relay DTMF tones in SIP INFO packets, but carried as RFC 2833 payload.<br>Select **SIP Info** to relay DTMF tones as SIP INFO messages. |
| Fax Service | Choose the fax method configured on the peer device.<br>Select **T.38** to send fax signals according to ITU-T T-38.<br>Select **G.711** to send fax signals according to ITU-T G.711. |
| Flash | Use this field to select the method the system uses to process the flash signal from a user.<br>• **Invite**: relays flash by SIP INVITE signal. The flash type cannot be **Invite** when you use the **v5sip Op Mode**.<br>• **Rfc2833**: relays flash according to RFC 2833.<br>• **RFC2833 Like**: relays flash in SIP INFO packets, but carried as RFC 2833 payload<br>• **SIP Info 1**: relays flash in SIP INFO packets (a `signal=16` message)<br>• **SIP Info 2**: relays flash in SIP INFO packets (a `signal=hf` message)<br>• **SIP Info 3**: relays flash in SIP INFO packets (a `signal=hook-flash` message)<br>• **SIP Info 4**: relays flash in SIP INFO packets (a plain text "FLASH" message).<br>• **SIP Info 5**: relays flash in SIP INFO packets (multiple SIP messages). The message content is determined by the characters you enter in the field that appears to the right of the list. A separate SIP INFO message is sent for each character you enter.<br>• **SIP Info 6**: relays flash in SIP INFO packets (where the content of the message is determined by the text you enter in the field that appears to the right of the list). |

**Table 122** Profile > VoIP SIP CALLSVC Screen

| LABEL | DESCRIPTION |
|---|---|
| Key Pattern | Enter the name of a key pattern table for supplementary services.<br>The default key pattern table “DEFVAL” has the following settings:<br>*99#: enable DND (Do Not Disturb).<br>#99#: disable DND.<br>*43#: enable call-waiting.<br>#43#: disable call-waiting.<br>0: call-waiting reject.<br>1: call-waiting accept and disconnect.<br>2: call-waiting accept and on-hold.<br>3: call back on busy.<br>##: calling line identifier restriction.<br>*98#: call transfer.<br>*97#: call return.<br>#14: callin.<br>Key pattern tables can be configured using the command line interface only. |
| Local Help | Select **ON** if you want to implement the local help feature. Select **OFF** if you do not want to use the local help feature.<br>The local help feature allows users to call other users in the event that the connection to the regular telephony service provider is not available. See Section 17.10 on page 427 for more information on the local help feature. |
| Local Help Number | Select the number of local help tables you want to use. |
| Reanswer Time | When using v5sip mode use this field to set the reanswer time period. The reanswer time controls the length of time between the user hanging up the phone, and the call being disconnected (the BYE request being sent).<br>Within this time, a user can pick up the receiver again, or move to another telephone on the same line and pick up the receiver, and resume the call. |
| Index | This is the local help number index number. |
| Tel Number | Enter the telephone number users dial to access the subscribers listed in the corresponding local help table. When a user dials this number, and the connection to the regular telephony service provider is not available, the first number in the corresponding local help table rings. If the call is not answered, the second number in the table rings, and so on. |
| Localhelp table | Select the local help table you want users to access when they call the number in the **Tel Number** field. |
| All | Select this to allow subscribers to perform any of the call functions listed below. |
| Call hold | Select this to allow subscribers to place calls on hold. |
| Call wait | Select this to allow subscribers to use call waiting. |
| Call return | Select this to allow subscribers to use call return. |
| Call transfer | Select this to allow subscribers to transfer a call to another phone number. |
| CLIP | Select this to allow subscribers to present caller ID to the called party (Calling Line Identification Presentation). |
| CLIR | Select this to allow subscribers to not present caller ID to the called party (Calling Line Identification Restriction). |
| Do not disturb | Select this to allow subscribers to forbid incoming calls. |
| Local Call | Select this to allow subscribers to make calls to other subscribers if the system’s connection to the SIP server is not available. |
| CIDCW | Select this to allow Calling Identity Delivery on Call Waiting on this call service profile. |

**Table 122** Profile > VoIP SIP CALLSVC Screen

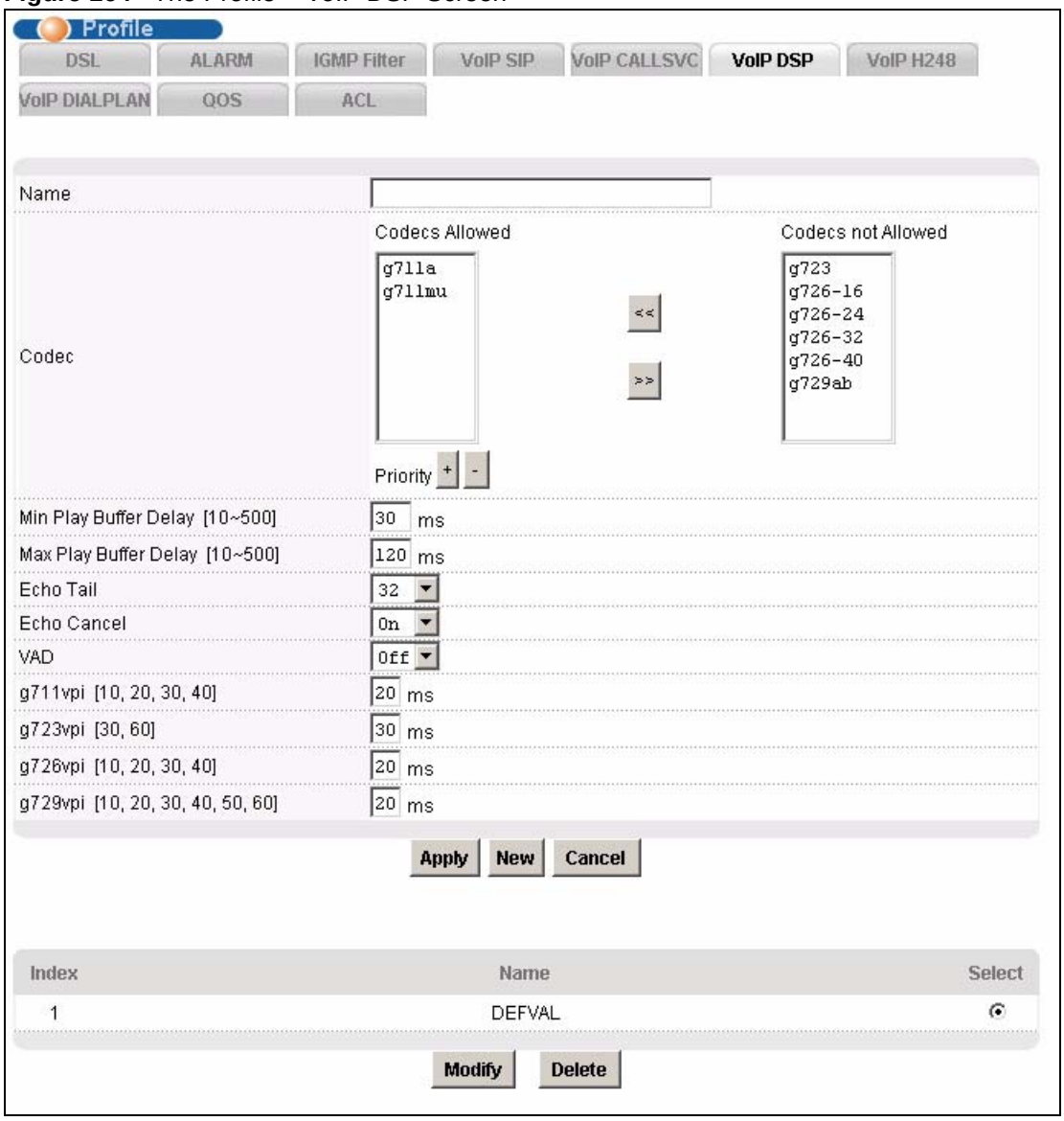
| LABEL | DESCRIPTION |
|---|---|
| MWI | Select this to enable the message waiting indicator for this call service profile. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Index | This is an incremental number indicating the order in which the call service profiles were created. |
| Name | This is the name of the call service profile. |
| Select | Select the call service profile you wish to modify or delete. |
| Modify | Select a call service profile and click this in order to edit its configuration. |
| Delete | Select a call service profile and click this to delete the profile. Once deleted, information cannot be retrieved. |

## 12.18 The Profile VoIP DSP Screen

Use this screen to configure the VOP's Digital Signal Processing (DSP) settings. You can then select a set of DSP information (known as a profile) and assign it to a port in the **Port** > **VoIP SIP** or **Port** > **VoIP H248** screen.

Click **Profile** > **VoIP DSP**. The following screen displays.

**Figure 164** The Profile > VoIP DSP Screen




The following table describes the labels in this screen.

**Table 123** The Profile > VoIP DSP Screen

| LABEL | DESCRIPTION |
|---|---|
| Name | Enter a name for this DSP profile (up to 31 ASCII characters; spaces are not allowed). |
| Codecs Allowed | This is the list of codecs to use in negotiation for this DSP profile. The codecs are listed by priority: the system tries to use the codec at the top of the list first and, if that is not possible, tries the second, and so on. |
| Codecs not Allowed | This is the list of codecs supported by the system but not used in this DSP profile. |
| << | Use this to move the selected codec from the **Not Allowed** list to the **Allowed** list. |
| >> | Use this to move the selected codec from the **Allowed** list to the **Not Allowed** list. |

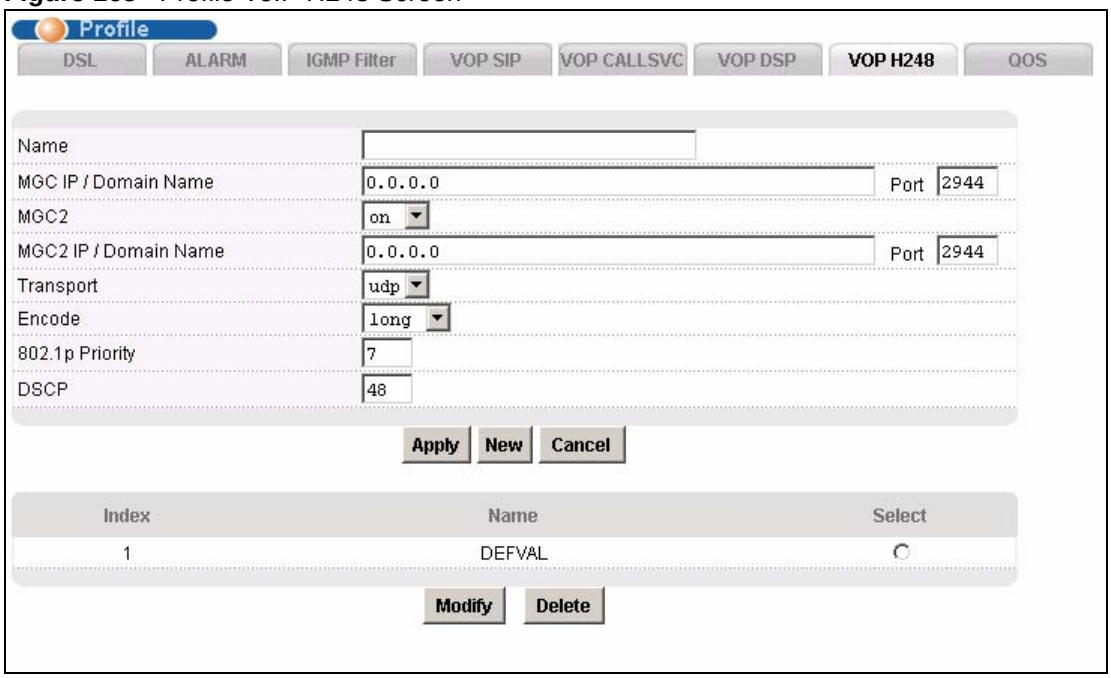
**Table 123** The Profile > VoIP DSP Screen

| LABEL | DESCRIPTION |
|---|---|
| Priority + | Use this to increase the priority of the selected codec by moving it up one place in the list. |
| Priority - | Use this to decrease the priority of the selected codec by moving it down one place in the list. |
| Min Play Buffer Delay (10~500) | This is the minimum time delay of the play buffer (10 ~ 500 milliseconds, must be less than or equal to the **Max Play Buffer Delay**). |
| Max Play Buffer Delay (10~500) | This is the maximum time delay of the play buffer (10 ~ 500 milliseconds, must be greater than or equal to the **Min Play Buffer Delay**). |
| Echo Tail | This is the echo-cancellation echo tail period (8/16/32/128 milliseconds). |
| Echo Cancel | Select this to enable echo cancellation. |
| Vad | Select this to enable Voice Activity Detection (VAD). |
| g711vpi | Set the Voice Packetization Interval for G.711. |
| g723vpi | Set the Voice Packetization Interval for G.723. |
| g726vpi | Set the Voice Packetization Interval for G.726. |
| g729vpi | Set the Voice Packetization Interval for G.729. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click this to start configuring the screen again. |
| Index | This is an incremental number indicating the order in which the DSP profiles were created. |
| Name | This is the name of the DSP profile. |
| Select | Select the DSP profile you wish to load or delete. |
| Modify | Select a DSP profile and click this in order to edit its configuration. |
| Delete | Select a DSP profile and click this to delete the profile. Once deleted, information cannot be retrieved. |

## 12.19 The Profile VoIP H248 Screen

Use this screen to configure information about the Media Gateway Controller (MGC) that the system uses for call control (and a backup controller, if required). Click **Profile** > **VoIP H248**. The following screen displays.

**Figure 165** Profile VoIP H248 Screen




The following table describes the labels in this screen.

**Table 124** Profile VoIP H248 Screen

| LABEL | DESCRIPTION |
|---|---|
| Name | Enter a name for this H.248 profile. |
| MGC IP / Domain Name | Enter the IP address or domain name of the H.248 media gateway controller. |
| Port | Enter the listening port number of the H.248 media gateway controller, if supplied by your VoIP provider. Otherwise, keep the default value. |
| MGC2 | If your VoIP service provider gave you details of a backup H.248 media gateway controller (MGC)H.248, select **On** and enter the details in the **MGC2 IP / Domain Name** and **Port** fields. The backup MGC<br>Otherwise, select **Off**. |
| MGC2 IP / Domain Name | If you selected **On** in the **MGC2** field, enter the IP address or domain name of the backup H.248 media gateway controller. |
| Port | If you selected **On** in the **MGC2** field, enter the listening port number of the backup H.248 media gateway controller, if supplied by your VoIP provider. Otherwise, keep the default value. |
| Transport | Choose the data transport method configured on the media gateway controller.<br>Select **UDP** to send data to the media gateway controller via User Datagram Protocol.<br>Select **TCP** to send data to the media gateway controller via Transmission Control Protocol. |
| Encode | Choose the text encoding method configured on the media gateway controller.<br>Select **Long** to use long form text encoding.<br>Select **Short** to use short form text encoding. |
| 802.1p Priority | Set the IEEE 802.1p priority value for traffic using this H.248 profile. |

**Table 124** Profile VoIP H248 Screen

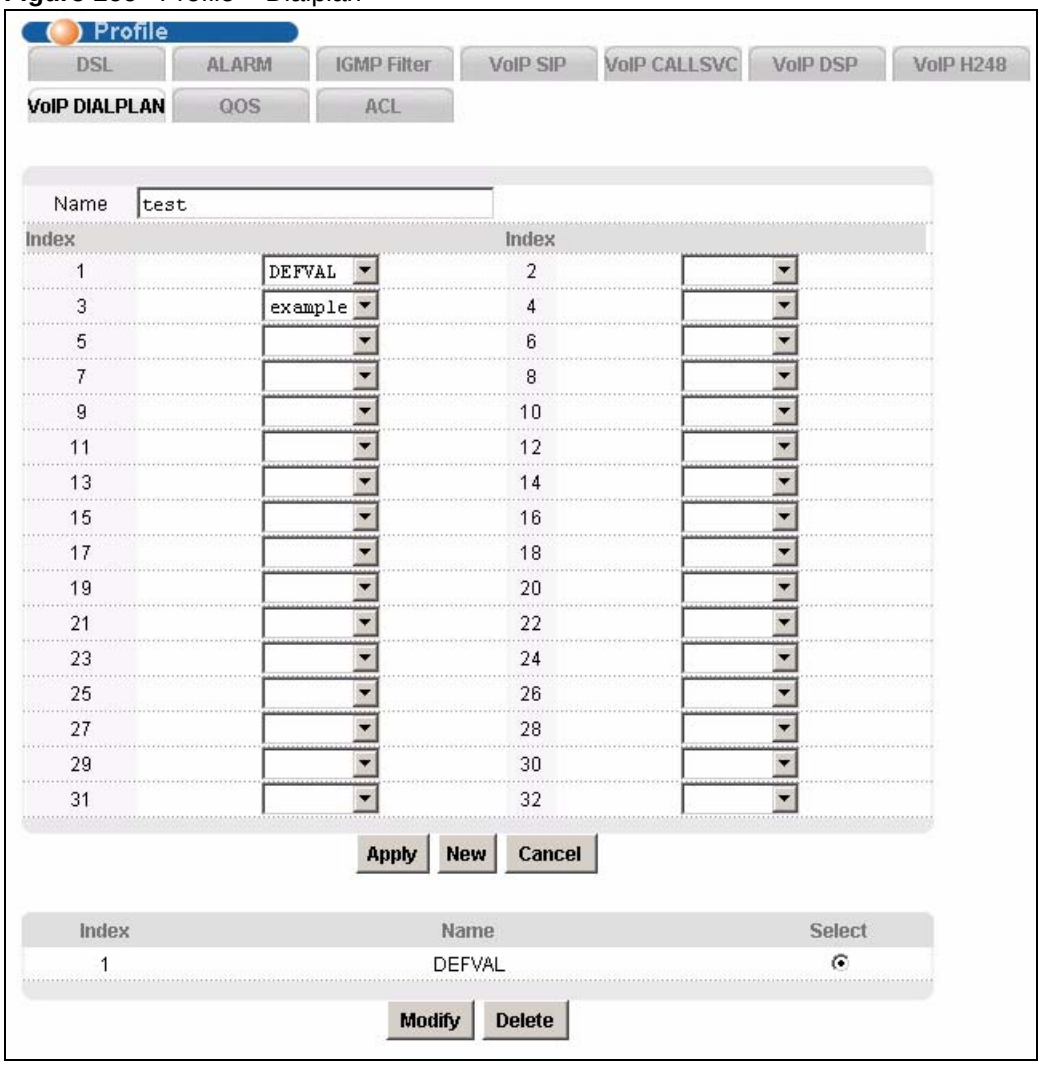
| LABEL | DESCRIPTION |
|---|---|
| DSCP | Set the DiffServ Code Point (DSCP) value for traffic using this H.248 profile. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Index | This is an incremental number indicating the order in which the H.248 profiles were created. |
| Name | This is the name of the H.248 profile. |
| Select | Select the H.248 profile you wish to load or delete. |
| Modify | Select a H.248 profile and click this in order to edit its configuration. |
| Delete | Select a H.248 profile and click this to delete the profile. Once deleted, information cannot be retrieved. |

## 12.20 VoIP Dial Plan Profile Screen

The system uses dial plans to identify specific types of phone numbers dialed by a user, and to process the number before transmission by deleting or adding digits according to the relevant rule. The dial plan can also forward the call to a specific SIP server. Use a dial plan profile to collect a group of dial plans into a profile. Then assign the dial plan profile to a port to apply all of the dial plans included in the profile.

Click **Profile** > **Dialplan** . The following screen displays. Use this screen to create and edit dial plan profiles. The dial plans must already be configured before you can do this (see the **VoIP > Dialplan** screen).

**Figure 166** Profile > Dialplan




The following table describes the labels in this screen.

**Table 125** Profile > Dialplan

| LABEL | DESCRIPTION |
|---|---|
| Name | Specify a name for the profile of dial plans. |
| Index | This is an incremental number indicating the order in which to apply the VoIP dial plans included in the profile.<br>Select a dial plan from the drop-down list box. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Index | This is an incremental number indicating the order in which the profiles were created. |

**Table 125** Profile > Dialplan

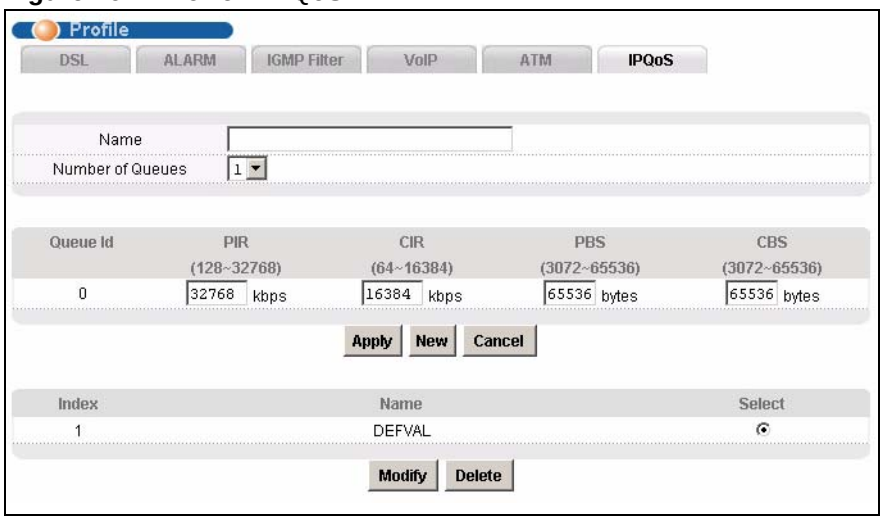
| LABEL | DESCRIPTION |
|---|---|
| Name | This is the name of the profile. |
| Select | Select the profile you wish to load or delete. |
| Modify | Select a profile and click this in order to edit its configuration. |
| Delete | Select a profile and click this to delete the profile. Once deleted, information cannot be retrieved. |

## 12.21 The IPQoS Screen

Click **Profile** > **IPQoS** to display the following screen. Use the **IPQoS** screen to configure a Quality of Service (QoS) profile for VDSL and PVC (Permanent Virtual Circuit) traffic. QoS allows you to configure priorities settings on traffic on different ports, providing a smoother flow of network traffic. At the time of writing, this feature is only available on VDSL line cards.

Follow these steps to set up a new IPQoS profile.

**Figure 167** Profile > IPQoS




The following table describes the labels in this screen.

**Figure 168** Profile > IPQoS

| LABEL | DESCRIPTION |
|---|---|
| Name | Type a descriptive name for the IP QoS profile. You can type up to 31 alphanumeric characters. |
| Number of Queues | Select how many queues this profile has from the drop-down list. Each port that the profile references can have a maximum of eight queues. You can select **1**, **2**, **4** or **8** queues. |
| Index | The index numbers represent the queues assigned to a profile. They also map to priority levels on traffic on a port. For example, traffic in queue number 1 has lowest priority and queue number 8 traffic has highest. |

**Figure 168** Profile > IPQoS

| LABEL | DESCRIPTION |
|---|---|
| PIR (128~32768) | PIR (Peak Information Rate) is the maximum data rate allowed for a subscriber for downstream traffic flowing through the system. Actual data rates may drop below this level depending on the total bandwidth available or subscriber requirements.<br>Configure the PIR for a queue according to its priority level.<br>The PIR is between 128~32768 kbps and increases in increments of 64 kbps. The PIR must be more than the CIR but less than twice the CIR. |
| CIR (64~16384) | CIR (Committed Information Rate) is the guaranteed data rate available for a subscriber for downstream traffic flowing through the system. Actual data rates may drop below this level if not required by the subscriber.<br>Configure the CIR for a queue according to its priority level.<br>The CIR is between 64~16384 kbps and increases in increments of 64 kbps. The CIR must be less than the PIR, and two times the CIR must be greater than the PIR. |
| PBS (3072~65536) | PBS (Peak Burst Size) specifies the maximum burst size allowed for a subscriber for downstream traffic flowing through the system, as long as the PIR is not exceeded.<br>Configure the PBS for a queue according to its priority level.<br>The PBS is between 3072~65536 bytes and increases in increments of 256 bytes.<br><br>Note: VDSL line card operation may interfere with burst size settings. |
| CBS (3072~65536) | CBS (Committed Burst Size) specifies the guaranteed burst size allowed for a subscriber for downstream traffic flowing through the system, as long as the PIR is not exceeded.<br>Configure the CBS for a queue according to its priority level.<br>The CBS is between 3072~65536 bytes and increases in increments of 256 bytes.<br><br>Note: VDSL line card operation may interfere with burst size settings. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Index | This is an incremental number indicating the alphabetical order of the IP QoS profiles. |
| Name | This is the name of the IP QoS profile. |
| Select | Select the IP QoS profile you wish to load or delete. |
| Modify | Select an IP QoS profile and click this to edit its configuration in a screen similar to the one above. **DEFVAL** is the default profile name, with **PIR**, **CIR**, **PBS** and **CBS** settings set to zero. |
| Delete | Select an IP QoS profile and click this to delete the profile. Once deleted, information cannot be retrieved. |

# 12.22 Access Control Logic (ACL) Overview

An ACL (Access Control Logic) profile allows the system to classify and perform actions on the upstream traffic. Each ACL profile consists of a rule and an action, and you assign ACL profiles to PVCs.

- Use the **Profile** > **ACL** screen (Section 12.23 on page 298) to configure the ACL profiles.
- Use the **ACL** > **Rule** screen (Section 5.15 on page 122) to assign the ACL profiles to PVCs.

## 12.22.1 ACL Profile Rules

If you apply multiple profiles to a PVC, the system checks the profiles by rule number. The lower the rule number, the higher the priority the rule (and profile) has. For example, there are two ACL profiles assigned to a PVC. Profile1 is for VLAN ID 100 (rule number 9) traffic, and Profile2 is for IEEE 802.1p priority 0 traffic (rule number 12). The system checks Profile1 first. If the traffic is VLAN ID 100, the system follows the action in Profile1 and does not check Profile2. You cannot assign profiles that have the same rule numbers to the same PVC.

## 12.22.2 ACL Profile Actions

The system can perform the following actions after it classifies upstream traffic.

- rate: change the rate to the specified value (1~65535 kbps)
- rvlan: change the VLAN ID to the specified value (1~4094)
- rpri: change the IEEE 802.1p priority to the specified value (0~7)
- deny: do not forward the packet

The system can apply more than one action to a packet, unless you select **deny**.

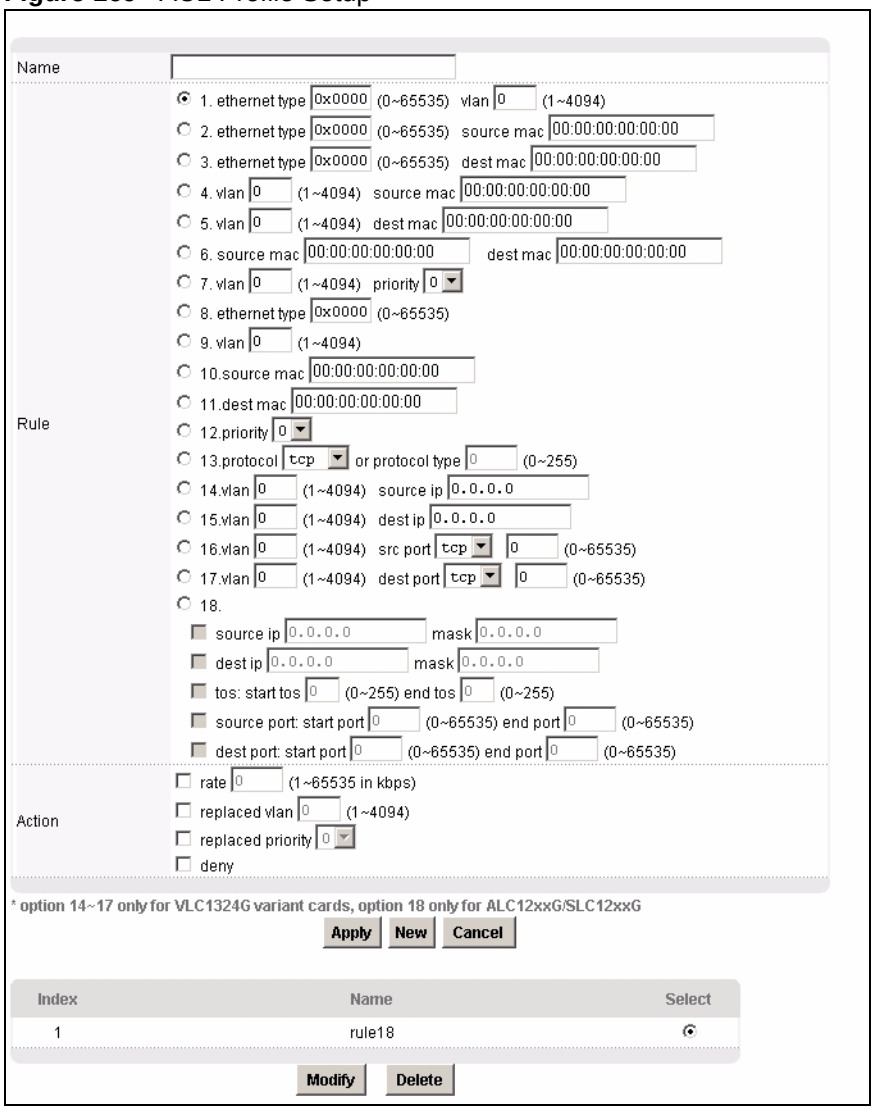
If you select the rvlan action, the system replaces the VLAN ID before it compares the VLAN ID of the packet to the VID of the PVC. As a result, it is suggested that you replace VLAN ID on super channels, not normal PVC, since super channels accept any tagged traffic. If you replace the VLAN ID for a normal PVC, the system drops the traffic because the new VLAN ID does not match the VID of the PVC. This is illustrated in the following scenario.

There is a PVC with PVID 900. You create an ACL rule to replace the VLAN ID with 901. Initially, the traffic for the PVC belongs to VLAN 900. Then, the system checks the ACL rule and changes the traffic to VLAN 901. When the system finally compares the VLAN ID of the traffic (901) to the VID of the PVC (900), the system drops the packets because they do not match.

# 12.23 ACL Profile Setup Screen

Use this screen to set up ACL profiles. To open this screen, click **Advanced Application**, **Profile** > **ACL**.

**Figure 169** ACL Profile Setup


Name
Rule
1. ethernet type 0x0000 (0~65535) vlan 0 (1~4094)
2. ethernet type 0x0000 (0~65535) source mac 00:00:00:00:00:00
3. ethernet type 0x0000 (0~65535) dest mac 00:00:00:00:00:00
4. vlan 0 (1~4094) source mac 00:00:00:00:00:00
5. vlan 0 (1~4094) dest mac 00:00:00:00:00:00
6. source mac 00:00:00:00:00:00 dest mac 00:00:00:00:00:00
7. vlan 0 (1~4094) priority 0
8. ethernet type 0x0000 (0~65535)
9. vlan 0 (1~4094)
10.source mac 00:00:00:00:00:00
11.dest mac 00:00:00:00:00:00
12.priority 0
13.protocol tcp or protocol type 0 (0~255)
14.vlan 0 (1~4094) source ip 0.0.0.0
15.vlan 0 (1~4094) dest ip 0.0.0.0
16.vlan 0 (1~4094) src port tcp 0 (0~65535)
17.vlan 0 (1~4094) dest port tcp 0 (0~65535)
18.
source ip 0.0.0.0 mask 0.0.0.0
dest ip 0.0.0.0 mask 0.0.0.0
tos: start tos 0 (0~255) end tos 0 (0~255)
source port: start port 0 (0~65535) end port 0 (0~65535)
dest port: start port 0 (0~65535) end port 0 (0~65535)
Action
rate 0 (1~65535 in kbps)
replaced vlan 0 (1~4094)
replaced priority 0
deny
* option 14~17 only for VLC1324G variant cards, option 18 only for ALC12xxG/SLC12xxG
Apply
New
Cancel
Index
Name
Select
1
rule18
Modify
Delete

The following table describes the labels in this screen.

**Table 126** ACL Profile Setup

| LABEL | DESCRIPTION |
|---|---|
| Name | Enter a descriptive name for the ACL profile. The name can be 1-31 printable ASCII characters long. Spaces are not allowed. |
| Rule | Select which type of rule to use.<br><br>Note: The lower the number (1-14), the higher the priority the rule has.<br><br>Provide additional information required for the selected rule. Additional rules consist of one or more of the following criteria. |
| ethernet type | Enter the 16-bit EtherType value between 0 and 65535. |
| vlan | Enter a VLAN ID between 1 and 4094. |
| source mac | Enter the source MAC address. |

**Table 126** ACL Profile Setup (continued)

| LABEL | DESCRIPTION |
|---|---|
| dest mac | Enter the destination MAC address. |
| priority | Select the IEEE 802.1p priority. |
| protocol or protocol type | Select the IP protocol to use from the drop-down list box or select "-" and specify an IP protocol number (between 0 and 255) to use. |
| source ip | Enter the source IP address and subnet mask in dotted decimal notation. |
| dest ip | Enter the source IP address and subnet mask in dotted decimal notation. |
| tos | Enter the start and end Type of Service between 0 and 255. If you want to specify a single ToS, enter it as both the start and the end. |
| source port | Enter the source port or range of source ports. |
| dest port | Enter the destination port or range of destination ports. |
| Action | Select which action(s) the system should take when the criteria are satisfied. |
| rate | Enter the maximum bandwidth this traffic is allowed to have. |
| replaced vlan | Enter the VLAN ID that this traffic should use. |
| replaced priority | Select the IEEE 802.1p priority that this traffic should have. |
| deny | Select this if you want the system to reject this kind of traffic. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Index | This is an incremental number indicating the order in which the profiles were created. |
| Name | This is the name of the profile. |
| Select | Select the profile you wish to load or delete. |
| Modify | Select a profile and click this in order to edit its configuration. |
| Delete | Select a profile and click this to delete the profile. Once deleted, information cannot be retrieved. |

# 13

# Statistics Screens

This chapter describes the run-time statistics.

## 13.1 ARP Table

Address Resolution Protocol (ARP) is a protocol for mapping an Internet Protocol address (IP address) to a physical machine address, also known as a Media Access Control or MAC address, on the local area network.

An IP (version 4) address is 32 bits long. In an Ethernet LAN, MAC addresses are 48 bits long. The ARP table maintains an association between each MAC address and its corresponding IP address.

### 13.1.1 How ARP Works

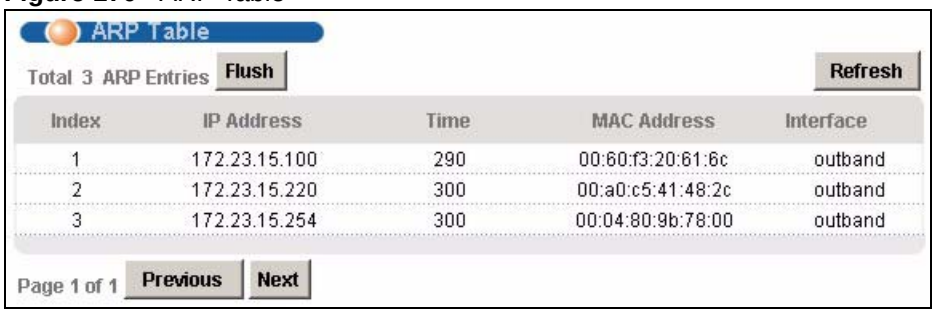
When an incoming packet destined for a host device on a local area network arrives at the switch, the switch's ARP program looks in the ARP Table and, if it finds the address, sends it to the device.

If no entry is found for the IP address, ARP broadcasts the request to all the devices on the LAN. The switch fills in its own MAC and IP address in the sender address fields, and puts the known IP address of the target in the target IP address field. In addition, the switch puts all ones in the target MAC field (FF.FF.FF.FF.FF.FF is the Ethernet broadcast address). The replying device (which is either the IP address of the device being sought or the router that knows the way) replaces the broadcast address with the target's MAC address, swaps the sender and target pairs, and unicasts the answer directly back to the requesting machine. ARP updates the ARP Table for future reference and then sends the packet to the MAC address that replied.

## 13.2 ARP Table Screen

Click **Statistics > ARP Table** in the navigation panel to open the following screen. This screen lists the IP addresses that the system has mapped to MAC addresses.

**Figure 170** ARP Table




The following table describes the labels in this screen.

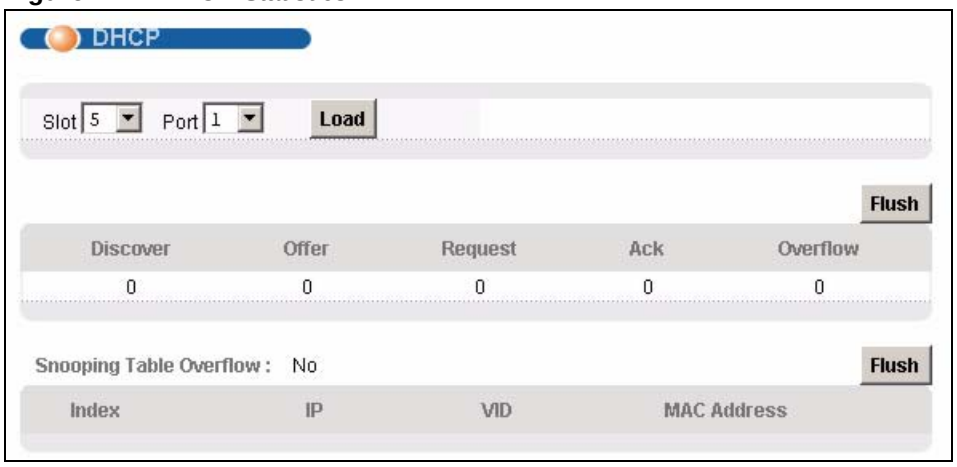
**Table 127** ARP Table

| LABEL | DESCRIPTION |
|---|---|
| Total X ARP Entries | This displays the number of entries in the ARP table. |
| Flush | Click **Flush** to remove all of the entries from the ARP table. |
| Index | This is the ARP table entry number. |
| IP Address | This is the learned IP address of a device connected to one of the system's ports. |
| Time | This is the remaining number of seconds that the entry will remain in the table before it is deleted (unless it is resolved again before the time period expires). An entry can remain in the ARP table for up to 300 seconds after it is created. This is the number of seconds that the entry has been in the table. |
| MAC Address | This is the MAC address of the device with the listed IP address. |
| Interface | This identifies to which interface (inband or outband) the device is connected. |
| Page X of X | This identifies which page of information is displayed and the total number of pages of information. |
| Previous/Next | Click one of these buttons to show the preceding/following screen if the information cannot be displayed in one screen. |

## 13.3 DHCP

To view DHCP packet counters on a port, click **Statistics** > **DHCP**.

**Figure 171** DHCP Statistics



The following table describes the labels in this screen.

**Table 128** DHCP Statistics

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the number of a line card's slot. |
| Port | Select the number of a DSL port on the line card. |
| Load | Click **Load** to retrieve the port's IGMP filter profile setting and display it in the **Profile** drop-down list box. |
| Flush | Click **Flush** to remove all of the entries from the table below. |
| Discover | This field displays the number of DHCP Discover packets on this port. |
| Offer | This field displays the number of DHCP Offer packets on this port. |
| Request | This field displays the number of DHCP Request packets on this port. |
| Ack | This field displays the number of DHCP Acknowledge packets on this port. |
| Overflow | This field displays the number of IP addressees not added to the DHCP snooping table when it is full. |
| Flush | Click **Flush** to remove all of the entries from the table below. |
| Snooping Table Overflow | This field displays whether the DHCP snooping table is full or not. |
| Index | This field displays the index number. |
| IP | This field displays the IP address assigned to a client n this port. |
| VID | This field displays the VLAN ID of the VLAN to which the client computer belongs. |
| MAC Address | This field displays the MAC address of the client computer. |

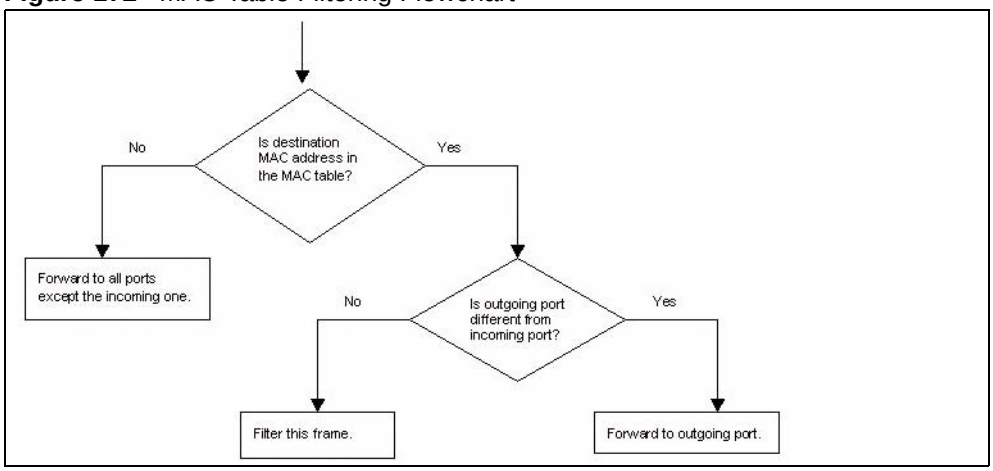
## 13.4 MAC Table

The MAC table lists device MAC addresses that are dynamically learned by the system. The table shows the following for each MAC address: the port upon which Ethernet frames were received from the device, to which VLAN groups the device belongs (if any) and to which channel it is connected (for devices connected to DSL ports).

The switch uses the MAC table to determine how to forward frames. See the following figure.

1. The switch examines a received frame and learns the port on which this source MAC address came.
2. The switch checks to see if the frame's destination MAC address matches a source MAC address already learned in the MAC table.
   - If the switch has already learned the port for this MAC address, then it forwards the frame to that port.
   - If the switch has not already learned the port for this MAC address, then the frame is flooded to all ports. Too much port flooding leads to network congestion.
   - If the switch has already learned the port for this MAC address, but the destination port is the same as the port it came in on, then it filters the frame.

**Figure 172** MAC Table Filtering Flowchart




## 13.5 MAC Table Screen

Click **Statistics** > **MAC Table** in the navigation panel to display the following screen. This screen lists device MAC addresses that the system dynamically learned.

**Figure 173** MAC Table

MAC Table

Date 2006/10/18
Time 14:23:27

Flush | All | Vid | Slot/Port all | Refresh

| Index | Vid | MAC Address | Port |
|---|---|---|---|
| 1 | 1 | 00:00:04:a0:00:31 | up1 |
| 2 | 1 | 00:00:e2:82:7d:90 | up1 |
| 3 | 1 | 00:02:3f:63:b1:5a | up1 |
| 4 | 1 | 00:02:3f:6c:6f:0a | up1 |
| 5 | 1 | 00:02:44:84:02:4d | up1 |
| 6 | 1 | 00:02:b3:2c:79:93 | up1 |
| 7 | 1 | 00:02:e3:57:80:e1 | up1 |
| 8 | 1 | 00:02:e3:57:ea:22 | up1 |
| 9 | 1 | 00:04:80:9b:78:00 | up1 |
| 10 | 1 | 00:07:40:ca:37:8e | up1 |
| 11 | 1 | [illegible] | up1 |
| [illegible] | 1 | 00:0f:fe:09:c5:[illegible] | up1 |
| 25 | 1 | 00:0f:fe:09:c9:94 | up1 |
| 26 | 1 | 00:0f:fe:0c:51:fc | up1 |
| 27 | 1 | 00:0f:fe:0c:ed:41 | up1 |
| 28 | 1 | 00:0f:fe:1e:4a:f7 | up1 |
| 29 | 1 | 00:0f:fe:26:57:82 | up1 |
| 30 | 1 | 00:10:b5:3c:58:20 | up1 |

The following table describes the labels in this screen.

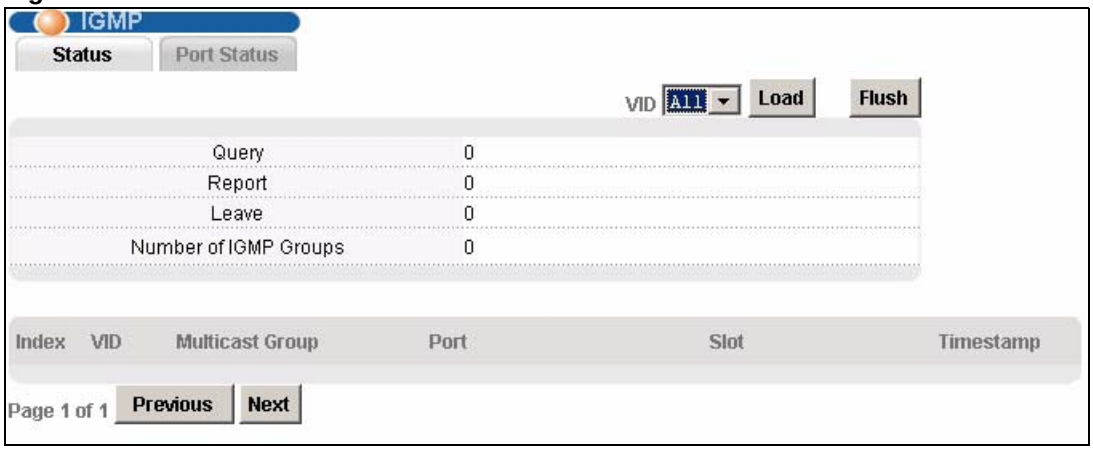
**Table 129** MAC Table

| LABEL | DESCRIPTION |
|---|---|
| Date | This displays the date that the displayed MAC address information was last updated. The date is in year, month and day format. |
| Time | This displays the time that the displayed MAC address information was last updated. The time is in (24-hour) hour, minute and second format. |
| Flush | Click **Flush** to remove all of the dynamically learned MAC address entries from the MAC table. |
| All | Select **All** to display the MAC address table of the port/slot belonging to all VLANs. |
| Vid | Select this open and enter a VLAN ID to display the MAC address table of the port/ slot belonging to this VLAN. |
| Slot/Port | Select an individual management switch card port or line card for which to show information. |
| Refresh | Click **Refresh** to update the list of dynamically learned MAC addresses. |
| Total Mac | This is the total number of connected MAC addresses that the system has learned are connected. |
| Index | This is the number of the MAC table entry. |
| Vid | This is the VLAN group to which the device belongs. |
| MAC Address | This is the MAC address of the device that the system has learned is connected to the port. |
| Port | This is the port to which the MAC address is associated. |
| Page X of X | This identifies which page of information is displayed and the total number of pages of information. |
| Previous/Next | Click one of these buttons to show the previous/next screen if all of the information cannot be seen in one screen. |

## 13.6 IGMP Status Screen

Click **Statistics** > **IGMP Status** in the navigation panel to display the following screen. Use this screen to view information collected by IGMP snooping and/or IGMP proxy.

**Figure 174** IGMP Status



The following table describes the labels in this screen.

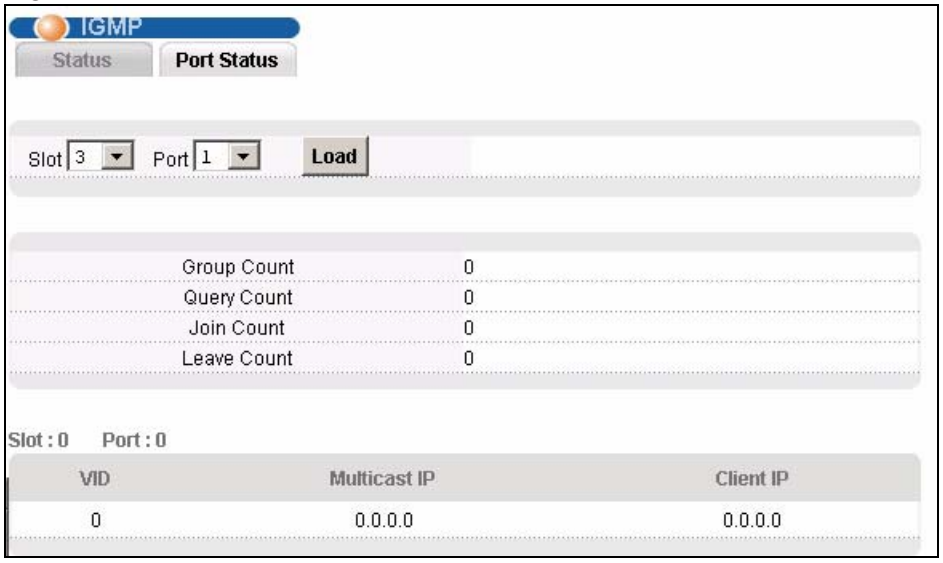
**Table 130** IGMP Status

| LABEL | DESCRIPTION |
|---|---|
| Query | This is the total number of Query packets received. |
| Report | This is the total number of Report packets received. |
| Leave | This is the total number of Leave packets received. |
| Number Of IGMP Groups | This is the number of IGMP groups that the system has identified on the local network. |
| The first table displays the names of the fields. The subsequent tables show the settings of the IGMP groups. | |
| Index | This is the IGMP group index number. |
| VID | The VID is the number that identifies the VLAN that the IP multicast group is on. Select a VID and click **Load** to show information. |
| Multicast Group | This is the static multicast IP address of an IP multicast group. |
| Flush | Click **Flush** to reset the counters. |
| Port | This column displays which ports are members of the IGMP group. |
| Slot | This column displays which slots are members of the IGMP group. |
| Timestamp | This is the time when the IGMP information was recorded. |
| Page X of X | This identifies which page of information is displayed and the total number of pages of information. |
| Previous/Next | Click one of these buttons to show the previous/next screen if all of the information cannot be seen in one screen. |

## 13.6.1 IGMP Port Statistics

Click **Statistics > IGMP Status** > **Port Status** to display the following screen. Use this screen to view information collected by IGMP snooping and/or IGMP proxy on a selected port.

**Figure 175** IGMP Status: Port Status



The following table describes the labels in this screen.

**Table 131** IGMP Status: Port Status

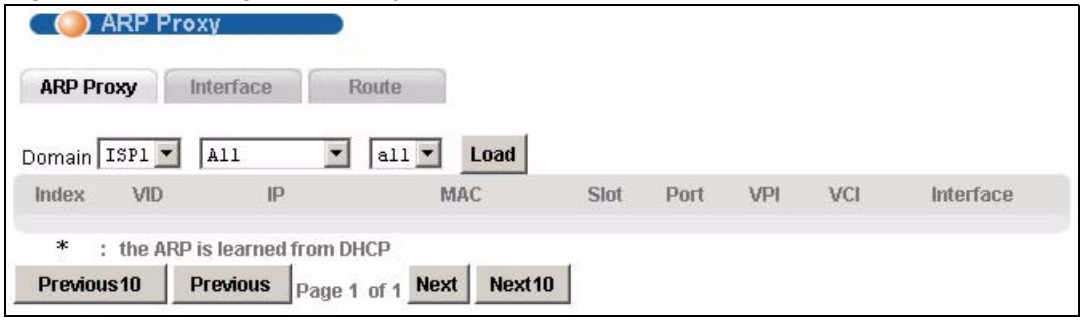
| LABEL | DESCRIPTION |
|---|---|
| Slot/Port | Select a line card and line card port and click **Load** to show information. |
| Group Count | This is the number of IGMP groups that the port is a member of. |
| Query Count | This is the total number of Query packets received. |
| Join Count | This is the total number of Join packets received. |
| Leave Count | This is the total number of Leave packets received. |
| The first table displays the names of the fields. The subsequent tables show the settings of the IGMP groups. | |
| Port | This field displays the selected port number. |
| Slot | This field displays the selected slot number. |
| VID | The VID is the number that identifies the VLAN that the IP multicast group is on. |
| Multicast IP | This is the static multicast IP address of an IP multicast group. |
| Client IP | This column displays which ports are members of the IGMP group. |

## 13.7 IP Bridge ARP Proxy Screen

Use this screen to look at the Address Resolution Protocol (ARP) table for each IP bridge domain.

To open this screen, click **Statistics** > **IP Bridge** > **ARP Proxy**.

**Figure 176** IP Bridge ARP Proxy




The following table describes the labels in this screen.

**Table 132** IP Bridge ARP Proxy

| LABEL | DESCRIPTION |
|---|---|
| Domain, Load | Select the domain at whose ARP table you want to look. You can also look at the ARP table entries for a specific type of interface or a specific interface in the domain. Click **Load** to display the requested entries below. |
| Index | This field displays the number of the IP address entry. |
| VID | This field displays the ID of the VLAN to which the device belongs. |
| IP | This field displays the IP address assigned to the specific device. |
| MAC | This field displays the MAC (Media Access Control) address of the device. |

**Table 132** IP Bridge ARP Proxy (continued)

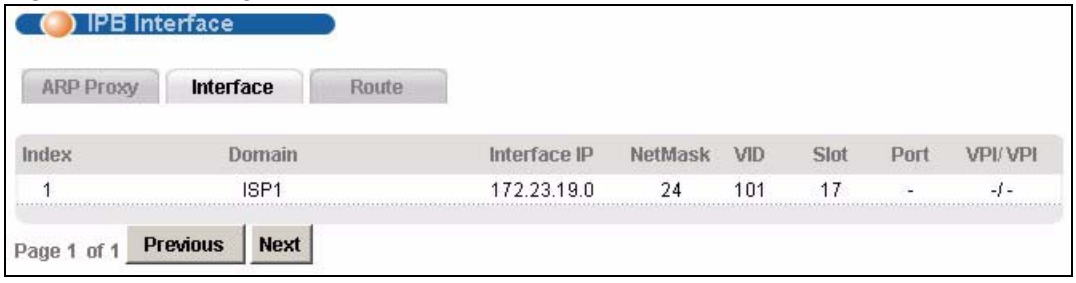
| LABEL | DESCRIPTION |
|---|---|
| Slot | This field displays the number of the slot that contains the line card with the port number to which the device is connected. |
| Port | This field displays the line card's port number to which the device is connected. |
| VPI | This field displays the Virtual Path Identifier (VPI) the device is using. The VPI and VCI identify a channel on a port. |
| VCI | This field displays the Virtual Circuit Identifier (VCI) the device is using. The VPI and VCI identify a channel on a port. |
| Interface | This field displays the name of the interface the device is using. |
| Previous 10 | Click **Previous 10** to show the preceding 10 pages of information. |
| Previous | Click **Previous** to show the preceding screen if the information cannot be displayed in one screen. |
| Page X of X | This identifies which page of information is displayed and the total number of pages of information. |
| Next | Click **Next** to show the following screen if the information cannot be displayed in one screen. |
| Next 10 | Click **Next 10** to show the following 10 pages of alarms. |

## 13.8 IP Bridge Interfaces Screen

Use this screen to look at all the forwarding information for downstream traffic, whether learned by snooping DHCP packets or provided manually.

To open this screen, click **Statistics** > **IP Bridge** > **Interface**.

**Figure 177** IP Bridge Interfaces




The following table describes the labels in this screen.

**Table 133** IP Bridge Interfaces

| LABEL | DESCRIPTION |
|---|---|
| Index | This field displays the index number of the downlink interface. |
| Domain | This field displays the name of the domain to which this entry applies. |
| Interface IP, NetMask | These fields display the IP address and the number of bits in the subnet mask that define the range of IP addresses to which this downlink interface applies. If the destination IP address of a packet is in this range, the system tries to forward the frame to a subscriber in the specified VLAN and PVC, if any. |
| VID | This field displays the VLAN ID the subscriber is in. |
| Slot | This field displays the number of the slot that contains the line card with the port number to which the system forwards frames. |

**Table 133** IP Bridge Interfaces (continued)

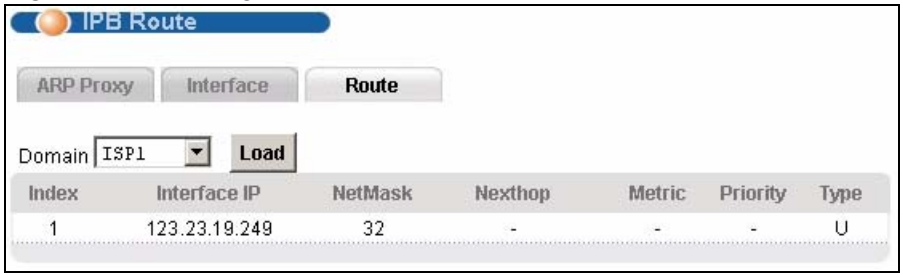
| LABEL | DESCRIPTION |
|---|---|
| Port | This field displays the line card's port number to which the device is connected. It displays "**-**" if the system looks for the subscriber in the whole VLAN and not a specific PVC. |
| VPI/VCI | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI), if any. The VPI and VCI identify a channel on this port. |
| Type | This field specifies whether the downlink interface is running on Ethernet (**ipoe**) or on ATM (**ipoa**). |

## 13.9 IP Bridge Routes Screen

Use this screen to look at the routing table for a domain. This table includes all the entries, whether added automatically by the system or provided manually.

To open this screen, click **Statistics** > **IP Bridge** > **Route**.

**Figure 178** IP Bridge Routes




The following table describes the labels in this screen.

**Table 134** IP Bridge Routes

| LABEL | DESCRIPTION |
|---|---|
| Domain | Select a domain for which you wish to view information and click **Load** to display it. |
| Index | This field displays the number of the entry. |
| Domain Name | This field displays the name of the domain to which this entry applies. |
| Interface IP<br>NetMask | These fields display the IP address and the number of bits in the subnet mask that define the range of IP addresses to which this entry applies. If the destination IP address of a packet is in this range, the system forwards the frame to the specified edge router. |
| Nexthop | This field displays the IP address to which the system forwards frames if the destination IP address of a packet is in the specified range. It displays "**-**" if the field does not apply to the entry (for example, in entries created automatically by the system). |
| Metric | This field displays the "cost" of transmission for routing purposes. It displays "**-**" if the field does not apply to the entry (for example, in entries created automatically by the system). |

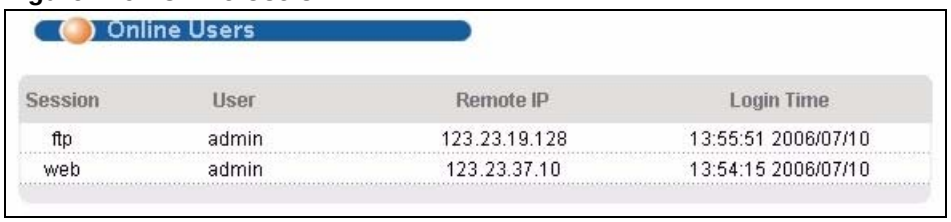
**Table 134** IP Bridge Routes (continued)

| LABEL | DESCRIPTION |
|---|---|
| Priority | This field displays the priority value (0 to 7) to add to incoming frames without a (IEEE 802.1p) priority tag. It displays "-" if the field does not apply to the entry (for example, in entries created automatically by the system). |
| Type | This field indicates whether this entry is used for upstream traffic (**U**) or downstream traffic (**D**). By default, all entries are for downstream traffic, unless the edge router is configured in the edge router screen (see Section 11.16 on page 235). |

## 13.10 Online Users Screen

Click **Statistics** > **Online Users** in the navigation panel to display the following screen. Use this screen to view information about administrators that are logged into the system.

**Figure 179** Online Users




The following table describes the labels in this screen.

**Table 135** Online Users

| LABEL | DESCRIPTION |
|---|---|
| Session | This is the type of connection that the administrator is using (web, console, or telnet). |
| User | This is the user name that the administrator is using. |
| Remote IP | This is the IP address of the administrator's computer. |
| Login Time | This displays the time and date that the administrator logged into the system. The time is in (24-hour) hour, minute and second format. The date is in year, month and day format. |

## 13.11 Port Statistics

Click **Statistics** > **Port Statistics** in the navigation panel to display the following screen. Use this screen to view port information (such as packet counts, uptime etc.).

You can only view port information on an active card.

**Figure 180** Port Statistics

Port Statistics
ID State Card Type Uptime Firmware
1 active MSC1000G 22:40:04 V3.90(LU.0)b7
2 -
3 active VOP1248G-61 22:37:22 V3.90(AIU.0)b5
4 active VOP1248G-61 22:37:20 V3.90(AYF.0)b6
5 active ALC1248G-51 22:38:07 V3.90(ABD.0)b4
6 -
7 active ALC1248G-53 22:38:06 V3.90(ABE.0)b3
8 -
9 active SLC1248G-22 22:38:05 V3.90(ABF.0)b4
10 active ALC1272G-51 22:38:04 V3.90(ARV.0)b4

The following table describes the labels in this screen.

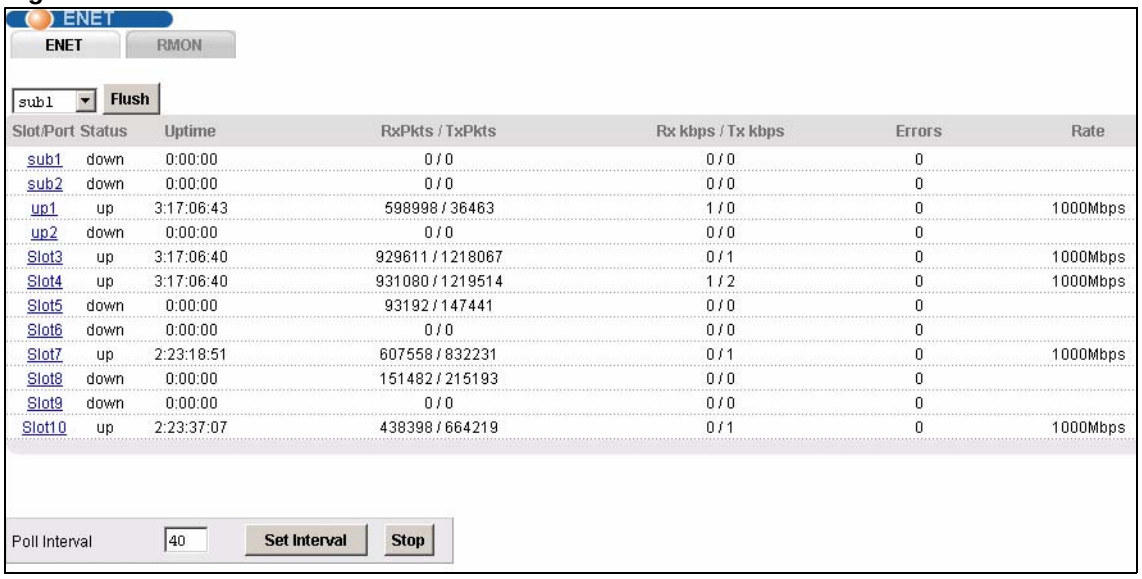
**Table 136** Port Statistics

| LABEL | DESCRIPTION |
|---|---|
| ID | This column lists the slot numbers of the cards. Click the ID number of an active card to go to a screen where you can view port status and statistics. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a card. |
| Uptime | This field displays how long the card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the card. |

## 13.11.1 MSC Port Statistics

Click the slot ID for an MSC1000G card in the **Port Statistics** screen to view Ethernet port status and statistics.

**Figure 181** MSC Port Statistics: ENET




The following table describes the labels in this screen.

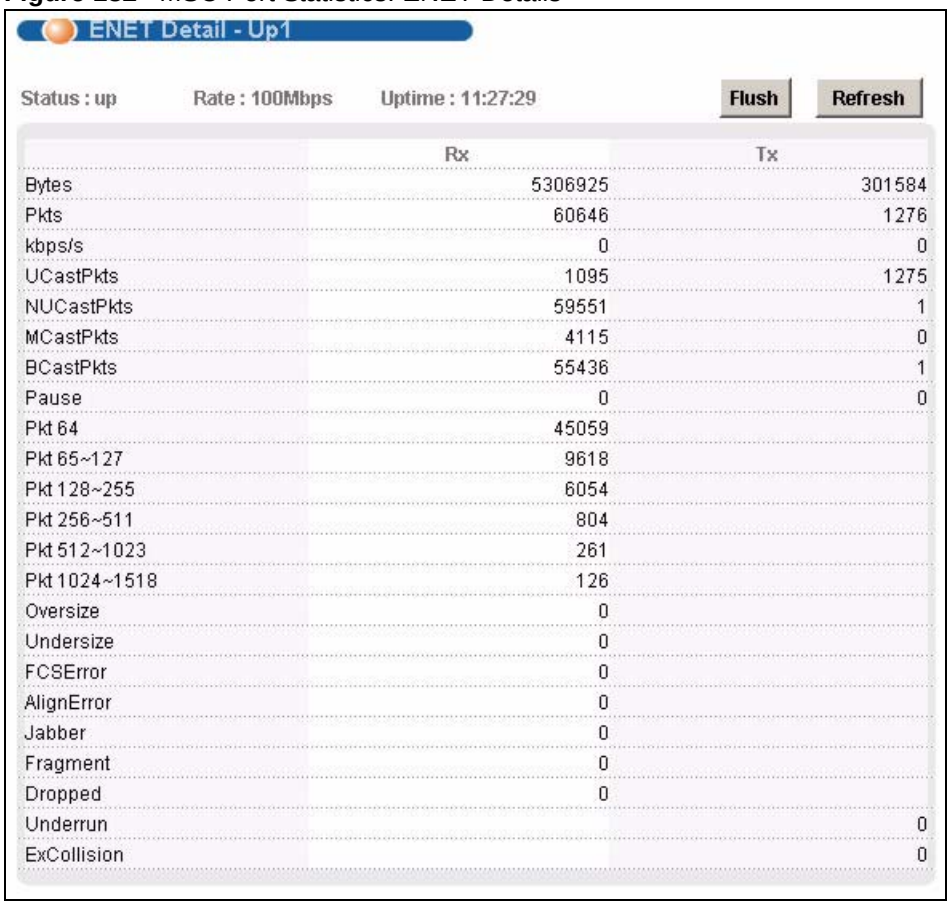
**Table 137** MSC Port Statistics: ENET

| LABEL | DESCRIPTION |
|---|---|
| Flush | Select a port or slot and click **Flush** to reset its counters. |
| Slot/Port | This field displays the port name or slot number. "**sub**" and "**up**" refer to the subtending and uplink Ethernet ports on the front panel of the MSC1000G card. "**Slot**" refers to a back panel Ethernet connection to one of the other cards. Click one of these links to see detailed Ethernet port statistics. |
| Status | This field displays whether the port is connected (**up**) or not (**down**). |
| Uptime | This field displays how long the port has been running (or connected) since the last time it was started. |
| RxPkts/ TxPkts | This field displays the number of packets received/transmitted on this port (including multicast, unicast, broadcast and bad packets). |
| Rx Kbps/ Tx Kbps | This field displays the number of octets of Ethernet frames received/transmitted per second counting the ones in bad packets, not counting framing bits but counting FCS (Frame Check Sequence) octets. An octet is an 8-bit binary digit (byte). |
| Errors | This field displays the number of error packets occurred on this port. |
| Rate | This field displays the transmission speed of the port. |
| Poll Interval(s) | The text box displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**. |
| Stop | Click **Stop** to stop port statistic polling. |

## 13.11.2 Detailed MSC Ethernet Port Statistics

To view detailed port statistics on a selected MSC Ethernet port, click the port index number in the ENET screen.

**Figure 182** MSC Port Statistics: ENET Details




| | Rx | Tx |
|---|---|---|
| Bytes | 5306925 | 301584 |
| Pkts | 60646 | 1276 |
| kbps/s | 0 | 0 |
| UCastPkts | 1095 | 1275 |
| NUCastPkts | 59551 | 1 |
| MCastPkts | 4115 | 0 |
| BCastPkts | 55436 | 1 |
| Pause | 0 | 0 |
| Pkt 64 | 45059 | |
| Pkt 65~127 | 9618 | |
| Pkt 128~255 | 6054 | |
| Pkt 256~511 | 804 | |
| Pkt 512~1023 | 261 | |
| Pkt 1024~1518 | 126 | |
| Oversize | 0 | |
| Undersize | 0 | |
| FCSError | 0 | |
| AlignError | 0 | |
| Jabber | 0 | |
| Fragment | 0 | |
| Dropped | 0 | |
| Underrun | | 0 |
| ExCollision | | 0 |

The following table describes labels in this example.

**Table 138** MSC Port Statistics: ENET Details

| LABEL | DESCRIPTION |
|---|---|
| Status | This shows whether or not the port has an active connection. |
| Rate | This shows the connection speed for an active connection. |
| Uptime | This shows how long the connection has been active. |
| Flush | Click **Flush** to clear the counters. |
| Refresh | Click **Refresh** to update this screen. |
| Bytes | This is the number of octets of Ethernet frames received/transmitted that are from 0 to 1518 octets in size, counting the ones in bad packets, not counting framing bits but counting FCS (Frame Check Sequence) octets. An octet is an 8-bit binary digit (byte). |
| Pkts | This is the number of packets received/transmitted on this port (including multicast, unicast, broadcast and bad packets). |
| kbytes/s | This is the number of octets of Ethernet frames received/transmitted per second. |
| UcastPkts | This is the number of good unicast frames received/transmitted. |
| NUcastPkts | This is the number of good non-unicast frames received/transmitted. |
| MCastPkts | This is the number of good multicast frames received/transmitted of 64 to 1518 octets in length (for non VLAN) or 1522 octets (for VLAN), not including Broadcast frames. Frames with range or length errors are also not taken into account. |

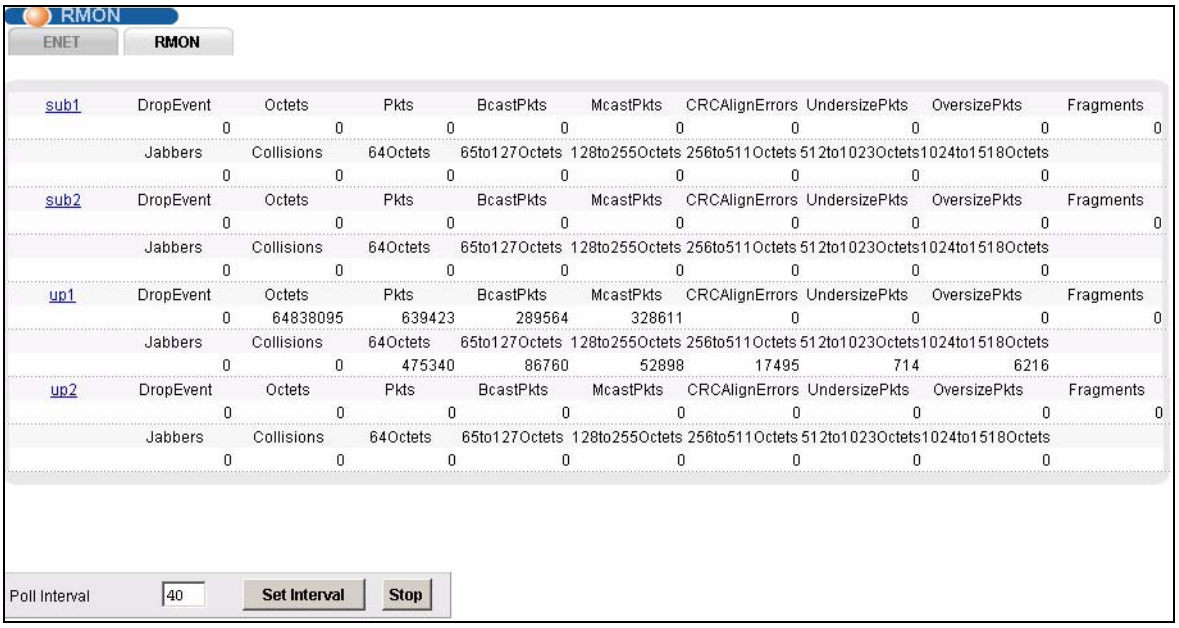
**Table 138** MSC Port Statistics: ENET Details (continued)

| LABEL | DESCRIPTION |
|---|---|
| BCastPkts | This is the number of good broadcast frames received/transmitted of 64 to 1518 octets in length (for non VLAN) or 1522 octets (for VLAN), not including multicast frames. Frames with range or length errors are also not taken into account. |
| Pause | This is the number of valid IEEE 802.3x Pause frames received/transmitted on this port. |
| Pkt64 | This is the number of frames received/transmitted (including bad frames) that were 64 octets or less in length (this includes FCS octets but excludes framing bits). |
| Pkt65~127 | This is the number of frames received/transmitted (including bad frames) that were 65 to 127 octets in length (this includes FCS octets but excludes framing bits). |
| Pkt128~255 | This is the number of frames received and transmitted (including bad frames) that were 128 to 255 octets in length (this includes FCS octets but excludes framing bits). |
| Pkt256~511 | This is the number of frames received/transmitted (including bad frames) that were 256 to 511 octets in length (this includes FCS octets but excludes framing bits). |
| Pkt512~1023 | This is the number of frames received/transmitted (including bad frames) that were 512 to 1023 octets in length (this includes FCS octets but excludes framing bits). |
| Pkt1024~1518 | This is the number of frames received/transmitted (including bad frames) that were 1024 to 1518 octets in length (this includes FCS octets but excludes framing bits). |
| Oversize | This is the number of frames received/transmitted that were bigger than 1518 (non VLAN) or 1522 (VLAN) octets and contained a valid FCS. |
| Undersize | This is the number of frames received/transmitted that were less than 64 octets long and contained a valid FCS. |
| FCSError | This is the number of frames received/transmitted with an integral length of 64 to 1518 octets and containing a Frame Check Sequence error. |
| AlignError | This is the number of frames received/transmitted that were 64 to 1518 (non VLAN) or 1522 (VLAN) octets long but contained an invalid FCS and a non-integral number of octets. |
| Jabber | This is the number of frames received/transmitted that were longer than 1518 octets (non VLAN) or 1522 octets (VLAN) and contained an invalid FCS, including alignment errors. |
| Fragment | This is the number of frames received/transmitted that were less than 64 octets long, and contained an invalid FCS, including non-integral and integral lengths. |
| Dropped | This is the number of received/transmitted frames that were received by the MSC1000G, but later dropped because of a lack of system resources. |
| Underrun | This is the number of outgoing frames that were less than 64 octets long. |
| Collision | This is the number of frames for which transmission failed due to excessive collisions. Excessive collision is defined as the number of maximum collisions before the retransmission count is reset. |

## 13.11.3 MSC RMON Statistics

To view RMON statistics on a switch port, click on the ID for the MSC1000G card in the **Port Statistics** screen and click the **RMON** tab.

**Figure 183** MSC Port Statistics: ENET: RMON


RMON
ENET
RMON
sub1 DropEvent Octets Pkts BcastPkts McastPkts CRCAlignErrors UndersizePkts OversizePkts Fragments
0 0 0 0 0 0 0 0 0
Jabbers Collisions 64Octets 65to127Octets 128to255Octets 256to511Octets 512to1023Octets 1024to1518Octets
0 0 0 0 0 0 0 0
sub2 DropEvent Octets Pkts BcastPkts McastPkts CRCAlignErrors UndersizePkts OversizePkts Fragments
0 0 0 0 0 0 0 0 0
Jabbers Collisions 64Octets 65to127Octets 128to255Octets 256to511Octets 512to1023Octets 1024to1518Octets
0 0 0 0 0 0 0 0
up1 DropEvent Octets Pkts BcastPkts McastPkts CRCAlignErrors UndersizePkts OversizePkts Fragments
0 64838095 639423 289564 328611 0 0 0 0
Jabbers Collisions 64Octets 65to127Octets 128to255Octets 256to511Octets 512to1023Octets 1024to1518Octets
0 0 475340 86760 52898 17495 714 6216
up2 DropEvent Octets Pkts BcastPkts McastPkts CRCAlignErrors UndersizePkts OversizePkts Fragments
0 0 0 0 0 0 0 0 0
Jabbers Collisions 64Octets 65to127Octets 128to255Octets 256to511Octets 512to1023Octets 1024to1518Octets
0 0 0 0 0 0 0 0
Poll Interval
40
Set Interval
Stop

The following table describes the labels in this screen.

**Table 139** MSC Port Statistics: ENET: RMON

| LABEL | DESCRIPTION |
|---|---|
| sub1~up2 | These are the Ethernet ports on the front panel of the MSC1000G card. Click one to view RMON history information for that port. |
| DropEvent | This field displays the total number of packets that were dropped on this port. |
| Octets | This field displays the total number of octets received/transmitted on this port. |
| Pkts | This field displays the total number of good packets received/transmitted on this port. |
| BcastPkts | This field displays the total number of broadcast packets received/transmitted on this port. |
| McastPkts | This field displays the total number of multicast packets received/transmitted on this port. |
| CRCAlignErrors | This field displays the total number of CRC (Cyclical Redundancy Check) alignment errors on this port. |
| UndersizePkts | This field displays the total number of packets that were too small received/ transmitted on this port. |
| OversizePkts | This field displays the total number of packets that were too big received/ transmitted on this port. |
| Fragments | This is the number of frames received/transmitted that were less than 64 octets long, and contained an invalid FCS, including non-integral and integral lengths. |
| Jabbers | This is the number of frames received/transmitted that were longer than 1518 octets (non VLAN) or 1522 octets (VLAN) and contained an invalid FCS, including alignment errors. |
| Collisions | This is the number of frames for which transmission failed due to excessive collisions. Excessive collision is defined as the number of maximum collisions before the retransmission count is reset. |
| 64Octets | This is the number of frames received/transmitted (including bad frames) that were 64 octets or less in length (this includes FCS octets but excludes framing bits). |

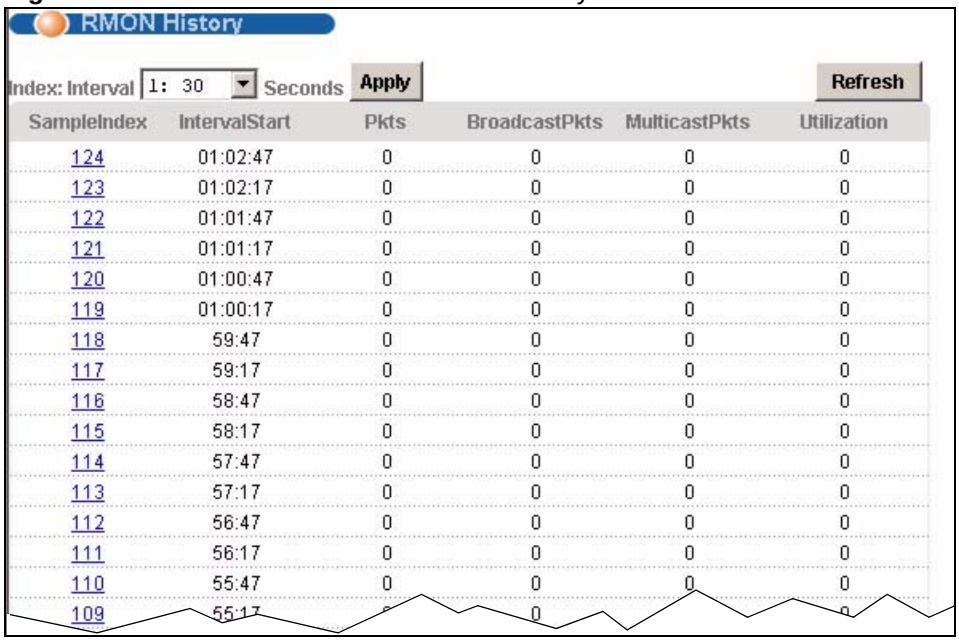
**Table 139** MSC Port Statistics: ENET: RMON (continued)

| LABEL | DESCRIPTION |
|---|---|
| 65to127Octets | This is the number of frames received/transmitted (including bad frames) that were 65 to 127 octets in length (this includes FCS octets but excludes framing bits). |
| 128to255Octets | This is the number of frames received and transmitted (including bad frames) that were 128 to 255 octets in length (this includes FCS octets but excludes framing bits). |
| 256to511Octets | This is the number of frames received/transmitted (including bad frames) that were 256 to 511 octets in length (this includes FCS octets but excludes framing bits). |
| 512to1023Octets | This is the number of frames received/transmitted (including bad frames) that were 512 to 1023 octets in length (this includes FCS octets but excludes framing bits). |
| 1024to1518Octets | This is the number of frames received/transmitted (including bad frames) that were 1024 to 1518 octets in length (this includes FCS octets but excludes framing bits). |
| Poll Interval(s) | The text box displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**. |
| Stop | Click **Stop** to stop port statistic polling. |

### 13.11.3.1 MSC RMON History Statistics

To view RMON history information, click a switch port link in the **RMON** screen. This RMON History screen displays general information (such as sample time) on history samples.

**Figure 184** Port Statistics: ENET: RMON History



The following table describes the labels in this screen.

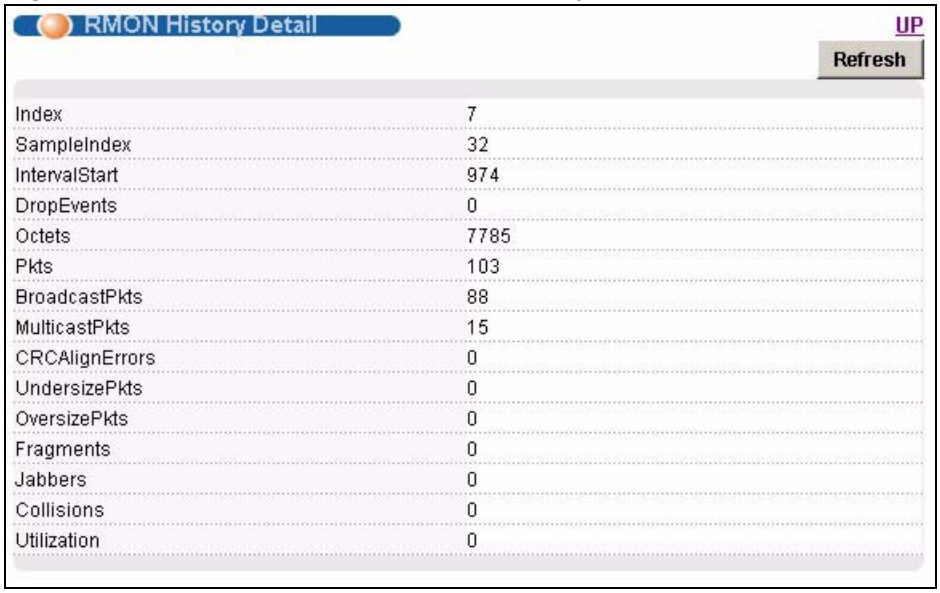
**Table 140** Port Statistics: ENET: RMON History

| LABEL | DESCRIPTION |
|---|---|
| Interval | Click **Apply** to use the selected data sampling time. |
| Refresh | Click **Refresh** to update this screen. |
| SampleIndex | This field display the index number. Click this link to view detailed RMON history information. |
| Interval Start | This field displays the data sampling time. |
| Pkts | This field displays the number of packets received/transmitted since the last sample time. |
| BroadcastPkts | This field displays the number of broadcast packets received/transmitted since the last sample time. |
| MulticastPkts | This field displays the number of multicast packets received/transmitted since the last sample time. |
| Utilization | This field displays the port utilization status. |

### 13.11.3.2 MSC RMON History Details

To view detail RMON history information, click on a sample index in the **RMON History** screen. An **RMON History Detail** screen displays. Refer to Table 139 on page 315 or Table 140 on page 317 for more field descriptions.

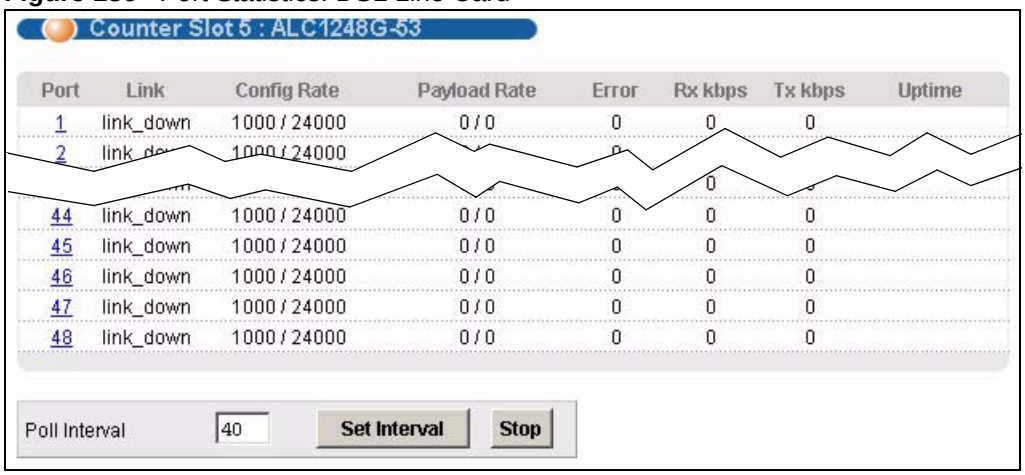
**Figure 185** Port Statistics: ENET: RMON History: Detail




## 13.11.4 DSL Line Card Statistics

Click the ID for a DSL line card in the **Port Statistics** screen to view port status and statistics on the line card. Statistics screens for the line cards are similar. Example screens for the ALC-1248G-53 are shown.

**Figure 186** Port Statistics: DSL Line Card


Counter Slot 5 : ALC1248G-53
Port
Link
Config Rate
Payload Rate
Error
Rx kbps
Tx kbps
Uptime
1 link_down 1000 / 24000 0 / 0 0 0 0
2 link_down 1000 / 24000
44 link_down 1000 / 24000 0 / 0 0 0 0
45 link_down 1000 / 24000 0 / 0 0 0 0
46 link_down 1000 / 24000 0 / 0 0 0 0
47 link_down 1000 / 24000 0 / 0 0 0 0
48 link_down 1000 / 24000 0 / 0 0 0 0
Poll Interval
40
Set Interval
Stop

The following table describes the labels in this screen.

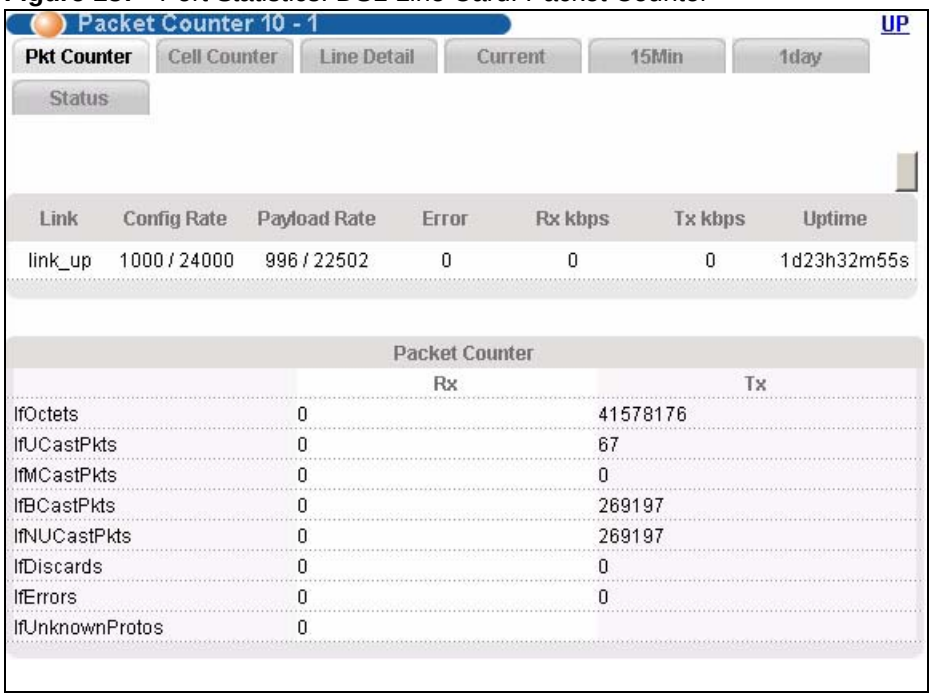
**Table 141** Port Statistics: DSL Line Card

| LABEL | DESCRIPTION |
|---|---|
| Port | This field displays the port number. |
| Link | This field displays the port link status.<br>On an SHDSL port, this field displays the wire pair setting when the port is up. |
| Config Rate | This field displays the configured upstream and downstream rates. |
| Payload Rate | This field displays the actual upstream and downstream rates. |
| Error | This field displays the number of errors occurred on the port. |
| Rx kbps | This field displays the receiving rate in kilo bits per second (kbps). |
| Tx kbps | This field displays the transmission rate in kilo bits per second (kbps). |
| Uptime | This field displays how long the connection is up. |
| Poll Interval(s) | The text box displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**. |
| Stop | Click **Stop** to stop port statistic polling. |

### 13.11.4.1 DSL Line Card Packet Counter

To display the packet counters of a port on a line card, click the port number in the line card's statistics screen (see Figure 186 on page 318).

**Figure 187** Port Statistics: DSL Line Card: Packet Counter




The following table describes the labels in this screen.

**Table 142** Port Statistics: DSL Line Card: Packet Counter

| LABEL | DESCRIPTION |
|---|---|
| Flush | Click **Flush** to clear the counters. |
| Link | This field displays the port link status. |
| Payload Rate | This field displays the configured and actual upstream and downstream rates. |
| Error | This field displays the number of errors occurred on the port. |
| Rx kbps | This field displays the receiving rate in kilo bits per second (kbps). |
| Tx kbps | This field displays the transmission rate in kilo bits per second (kbps). |
| Uptime | This field displays how long the port has been running since the last time it was started. |
| Packet Counter | |
| IfOctets | This field displays the number of octets received/transmitted on this port. |
| IfUCastPkts | This field displays the number of unicast packets received/transmitted on this port. |
| IfMCastPkts | This field displays the number of multicast packets received/transmitted on this port. |
| IfBCastPkts | This field displays the number of broadcast packets received/transmitted on this port. |
| IfNUCastPkts | This field displays the number of non-unicast packets received/transmitted on this port. |
| IfDiscard | This field displays the number of received/transmitted packets that were discarded on this port. |
| IfErrors | This field displays the number of packets received/transmitted with errors on this port. |

**Table 142** Port Statistics: DSL Line Card: Packet Counter (continued)

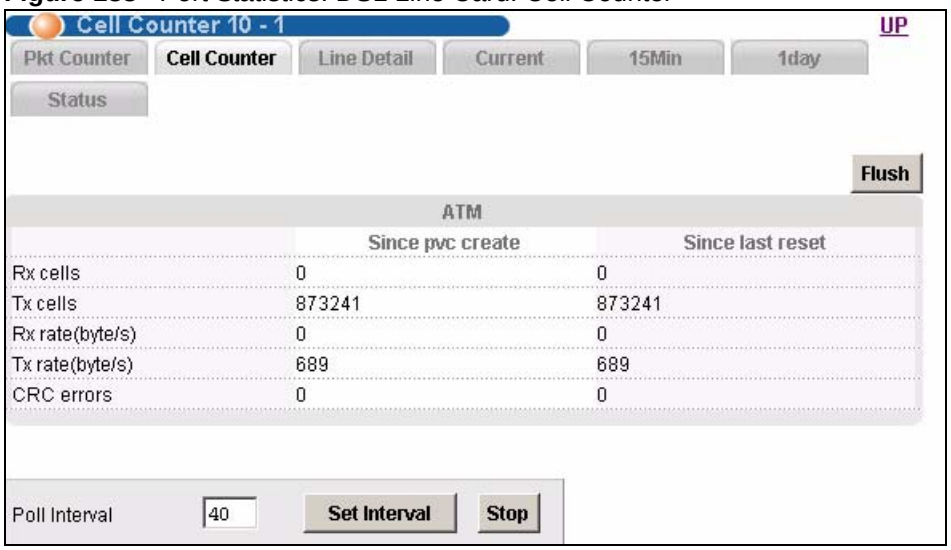
| LABEL | DESCRIPTION |
|---|---|
| IfUnknownProtos | This field displays the number of packets received/transmitted with unknown protocol number on this port. |
| Poll Interval(s) | The text box displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**. |
| Stop | Click **Stop** to stop port statistic polling. |

### 13.11.4.2 DSL Line Card Cell Counters

To display detailed ATM cell count information, click the port number in the line card's statistics screen (see Figure 186 on page 318) and click the **Cell Counter** tab.

The **Cell Counter** screen is not available for the VLC.

**Figure 188** Port Statistics: DSL Line Card: Cell Counter




The following table describes the labels in this screen.

**Table 143** Port Statistics: DSL Line Card: Cell Counter

| LABEL | DESCRIPTION |
|---|---|
| Flush | Click **Flush** to clear the counters. |
| ATM | |
| Rx cells | This field displays the number of cells received. |
| Tx Cells | This field displays the number of cells transmitted. |
| Rx rate (byte/sec) | This field displays the number of cells bytes received per second. |
| Tx rate (byte/sec) | This field displays the number of cells bytes transmitted per second. |
| CRC errors | This field displays the number of CRC errors. |

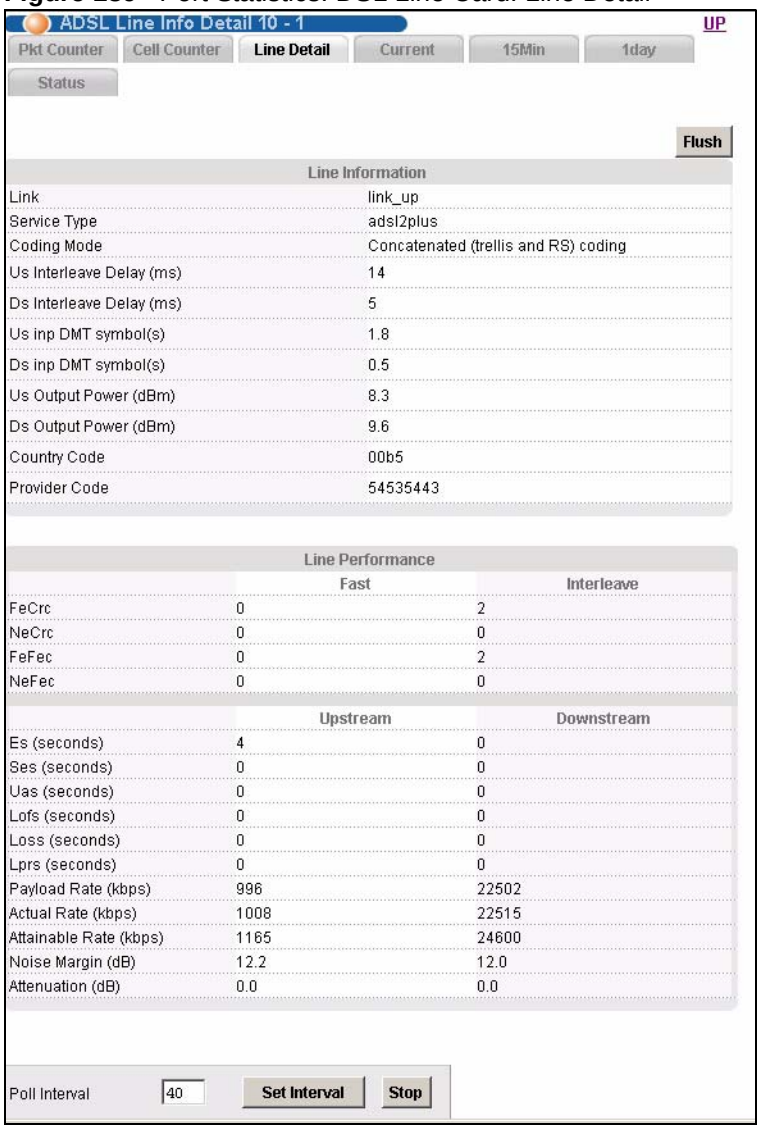
**Table 143** Port Statistics: DSL Line Card: Cell Counter (continued)

| LABEL | DESCRIPTION |
|---|---|
| Poll Interval(s) | The text box displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**. |
| Stop | Click **Stop** to stop port statistic polling. |

### 13.11.4.3 Line Detail

To display detailed line information, click the port number in the line card's statistics screen (see Figure 186 on page 318) and click the **Line Detail** tab.

**Figure 189** Port Statistics: DSL Line Card: Line Detail



The following table describes the labels in this screen.

**Table 144** Port Statistics: DSL Line Card: Line Detail

| LABEL | DESCRIPTION |
|---|---|
| Flush | Click **Flush** to clear the counters. |
| Line Information | |
| Link | This displays the connection status of the DSL link. |
| Service Type | This is the DSL standard that the port is using. |
| Coding Mode | Trellis coding helps to reduce the noise in ADSL transmissions. Trellis may reduce throughput but it makes the connection more stable.<br>"RS" coding stands for Reed-Solomon error correction. |
| Us Interleave Delay | This is the number of milliseconds of interleave delay for upstream transmissions. |
| Ds Interleave Delay | This is the number of milliseconds of interleave delay for downstream transmissions. |
| Us inp DMT symbol(s) | This is the number of impulse noise protection DMT symbols for upstream transmissions. |
| Ds inp DMT symbol(s) | This is the number of impulse noise protection DMT symbols for downstream transmissions. |
| Us Output Power (dBm) | This is the power output of the subscriber's DSL modem or router. The total output power of the transceiver varies with the line length and quality. |
| Ds Output Power (dBm) | This is the DSP port's output power. The total output power of the transceiver varies with the length and line quality. The farther away the subscriber's ADSL modem or router is or the more interference there is on the line, the higher the power will be. |
| Country Code | This is the country code acquired from the subscriber's ADSL device during negotiation/provisioning message interchanges. The country code is from the Vendor ID (see ITU-T G.994.1). |
| Provider Code | This is the provider code acquired from the subscriber's ADSL device during negotiation/provisioning message interchanges. The provider code includes the Vendor ID and Version Number obtained from the Vendor ID. |
| Min Rate (kbps) | This is the minimum upstream and downstream rates on the SHDSL port. |
| Config Rate (kbps) | This field displays the configured upstream and downstream rates on the SHDSL port. |
| Actual Rate (kbps) | This field displays the actual upstream and downstream rates on the SHDSL port. |
| Noise Margin (dB) | These are the SHDSL line's noise margins. Measured in decibels (dB). |
| Attenuation (dB) | These are the reductions in amplitude of the SHDSL signals. Measured in decibels (dB). |
| Linkup Count | This is the number of Linkup attempts on the VDSL port. |
| VTUC Vendor | This field displays the name of the CO VDSL device vendor. |
| VTUC Version | This field displays the name of the CO VDSL device hardware version. |
| VTUC Serial | This field displays the name of the CO VDSL device serial number. |
| VTUR Vendor | This field displays the name of the CPE VDSL device vendor. |
| VTUR Version | This field displays the name of the CPE VDSL device hardware version. |
| VTUR Serial | This field displays the name of the CPE VDSL device serial number. |
| Line Performance | |
| FeCrc | This is the number of far end cyclic redundancy checks. |

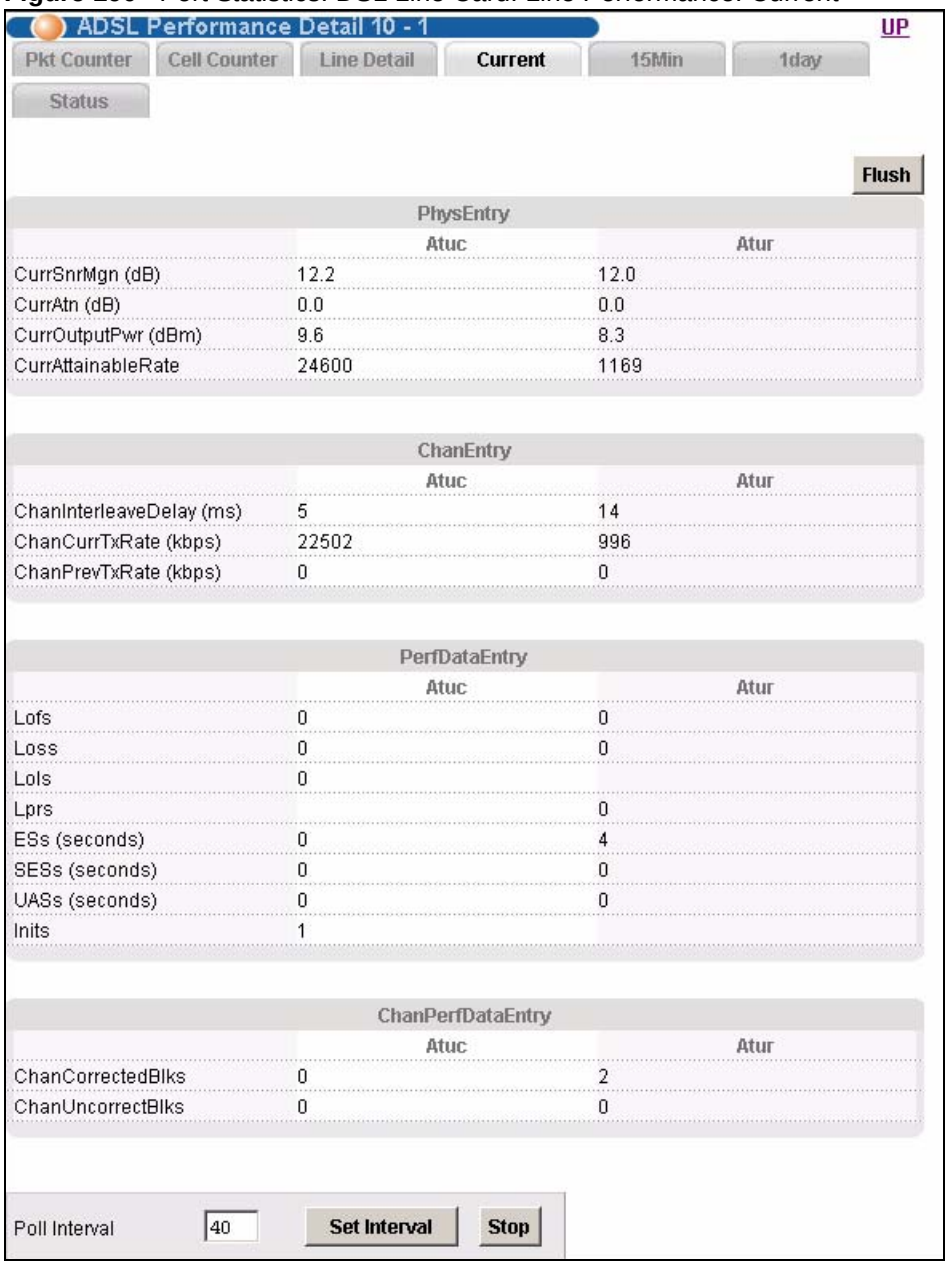
**Table 144** Port Statistics: DSL Line Card: Line Detail (continued)

| LABEL | DESCRIPTION |
|---|---|
| NeCrc | This is the number of near end cyclic redundancy checks. |
| FeFec | This is the number of far end corrected blocks. |
| NeFec | The is the number of near end corrected blocks. |
| Es (seconds) | This is the number of Errored Seconds. This is how many seconds contained at least one errored block or at least one defect. |
| Ses (seconds) | This is the number of Severely Errored Seconds. This is how many seconds contained 30% or more errored blocks or at least one defect. This is a subset of Es. |
| Uas (seconds) | This is the number of Unavailable seconds (Uas). |
| Lofs (seconds) | This is the number of Loss Of Frame (Lof) seconds. |
| Loss (seconds) | This is the number of Loss Of Signal (Los) seconds. |
| Lprs (seconds) | This is the number of times a Loss of PoweR (on the ATUR) has occurred. |
| CRC | This is the number of Cyclic Redundancy Check (CRC) error seconds. |
| Losws | This is the number of Lost Sync Word (LOSW) seconds. |
| Segment Anomaly | This is the number of segment anomaly seconds. |
| Segment Defect | This is the number of segment defect seconds. |
| Payload Rate (Kbps) | These are the data (the payload data without transport layer protocol headers and traffic) transfer rates (in Kbps) at which the port is receiving and sending data. |
| Actual Rate (Kbps) | These are the data transfer rates (in Kbps) at which the port is receiving and sending data. |
| Attainable Rate (Kbps) | These are the highest theoretically possible transfer rates (in Kbps) at which the port could receive and send data. |
| Noise Margin (dB) | These are the DSL line's noise margins. Measured in decibels (dB). |
| Attenuation (dB) | These are the reductions in amplitude of the DSL signals. Measured in decibels (dB). |
| Poll Interval(s) | The text box displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**. |
| Stop | Click **Stop** to stop port statistic polling. |

### 13.11.4.4 Current DSL Line Performance

To display current line performance counters, click the port number in the line card's statistics screen (see Figure 186 on page 318) and click the **Current** tab.

**Figure 190** Port Statistics: DSL Line Card: Line Performance: Current




The following table describes the labels in this screen.

**Table 145** Port Statistics: DSL Line Card: Line Performance: Current

| LABEL | DESCRIPTION |
|---|---|
| Flush | Click **Flush** to clear the counters. |
| PhysEntry | |
| CurrSnrMgn (dB) | These are the DSL line's current downstream and upstream signal to noise margins in decibels. |
| CurrAtn (dB) | These are the DSL line's current downstream and upstream line attenuation in decibels. |
| CurrOutputPwr (dBm) | These are the DSL line's current downstream and upstream output powers in decibels. |

**Table 145** Port Statistics: DSL Line Card: Line Performance: Current (continued)

| LABEL | DESCRIPTION |
|---|---|
| CurrAttainableRate | These are the DSL line's current downstream and upstream attainable rates in decibels. |
| ChanEntry | |
| ChanInterleaveDelay (ms) | These are the numbers of milliseconds of interleave delay for downstream and upstream transmissions. |
| SlowBurstProtect (kbps) | This field displays the level of impulse noise (burst) protection for a slow interleaved channel. |
| ChanCurrTxRate (kbps) | These are the DSL line's current downstream and upstream transmission rates in decibels. |
| ChanPrevTxRate (kbps) | These are the DSL line's previous downstream and upstream transmission rates in decibels. |
| PerfDataEntry | |
| Lofs | These are the DSL line's downstream and upstream numbers of Loss of frame Seconds that have occurred within the current 15 minute period. |
| Loss | These are the DSL line's downstream and upstream numbers of Loss of signal Seconds that have occurred within the current 15 minute period. |
| Lols | These are the DSL line's downstream and upstream numbers of Loss of link Seconds that have occurred within the current 15 minute period. |
| Lprs | These are the DSL line's downstream and upstream numbers of Loss of power Seconds that have occurred within the current 15 minute period. |
| ESs (seconds) | These are the DSL line's downstream and upstream numbers of Errored Seconds that have occurred within the current 15 minute period. |
| SESs (seconds) | This is the number of Severely Errored Seconds. This is how many seconds contained 30% or more errored blocks or at least one defect. This is a subset of Es. |
| UASs (seconds) | This is the number of Unavailable seconds (Uas). |
| Inits (seconds) | These are the DSL line's downstream and upstream numbers of initialization failure traps that have occurred within the current 15 minute period. |
| StatSesL (seconds) | These are the DSL line's downstream and upstream numbers of Severely errored seconds that have occurred within the current 15 minute period. |
| StatUasL (seconds) | These are the DSL line's downstream and upstream numbers of UnAvailable Seconds that have occurred within the current 15 minute period. |
| ChanPerfDataEntry | |
| ChanCorrectedBlks | These are the numbers of corrected blocks for downstream and upstream transmissions. |
| ChanUnCorrectedBlks | These are the numbers of uncorrected blocks for downstream and upstream transmissions. |
| EndpointCurrEntry | |
| CurrSnrMgn (dB) | These are the DSL line's current downstream and upstream signal to noise margins in decibels. |
| CurrAtn (dB) | These are the DSL line's current downstream and upstream line attenuation in decibels. |
| CRC (seconds) | This field displays the number of CRC anomalies since the system was last restarted |
| ESs (seconds) | This is the number of Errored Seconds. This is how many seconds contained at least one errored block or at least one defect. |

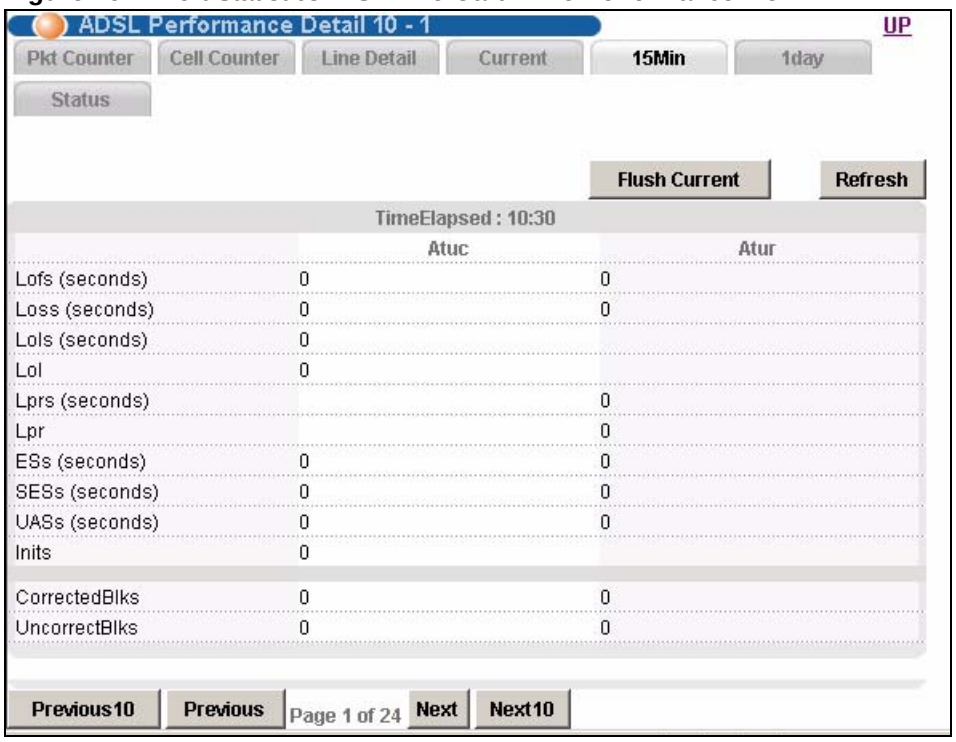
**Table 145** Port Statistics: DSL Line Card: Line Performance: Current (continued)

| LABEL | DESCRIPTION |
|---|---|
| SESs (seconds) | This is the number of Severely Errored Seconds. This is how many seconds contained 30% or more errored blocks or at least one defect. This is a subset of Es. |
| LOSWs (seconds) | This is the number of Lost Sync Word (LOSW) seconds. |
| UASs (seconds) | This is the number of Unavailable seconds (Uas). |
| Poll Interval(s) | The text box displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**. |
| Stop | Click **Stop** to stop port statistic polling. |

### 13.11.4.5 15Min DSL Line Performance

To display line performance counters for the past 15 minutes, click the port number in the line card's statistics screen (see Figure 186 on page 318) and click the **15Min** tab.

**Figure 191** Port Statistics: DSL Line Card: Line Performance: 15Min




The following table describes the labels in this screen.

**Table 146** Port Statistics: DSL Line Card: Line Performance: 15Min

| LABEL | DESCRIPTION |
|---|---|
| Flush Current | Click **Flush Current** to clear the counters. |
| Refresh | Click **Refresh** to update this screen. |
| TimeElapsed | This field displays the time since the last 15-minute data collection. |
| Lofs (seconds) | These are the DSL line's downstream and upstream numbers of Loss of frame Seconds that have occurred for the past 15 minute period. |
| Loss (seconds) | These are the DSL line's downstream and upstream numbers of Loss of signal Seconds that have occurred for the past 15 minute period. |

**Table 146** Port Statistics: DSL Line Card: Line Performance: 15Min (continued)

| LABEL | DESCRIPTION |
|---|---|
| Lols (seconds) | This is the DSL line's downstream number of Loss of link Seconds that have occurred for the past 15 minute period. |
| Lol | This is the number of times the DSL line's downstream connection has experienced a Loss of link during the past 15 minute period. |
| Lprs (seconds) | This is the DSL line's upstream number of Loss of power Seconds that have occurred for the past 15 minute period. |
| Lpr | This is the number of times the DSL line's upstream connection has experienced a Loss of power during the past 15 minute period. |
| ESs (seconds) | These are the DSL line's downstream and upstream numbers of Errored Seconds that have occurred for the past 15 minute period. |
| SESs (seconds) | These are the DSL line's downstream and upstream numbers of Severely Errored Seconds that have occurred for the past 15 minute period. This is how many seconds contained 30% or more errored blocks or at least one defect. This is a subset of Es. |
| UASs | These are the DSL line's downstream and upstream numbers of UnAvailable Seconds that have occurred for the past 15 minute period. |
| Inits | These are the DSL line's downstream and upstream numbers of initialization failure traps that have occurred for the past 15 minute period. |
| CorrectedBlks | These are the numbers of corrected blocks for downstream and upstream transmissions. |
| UnCorrectedBlks | These are the numbers of uncorrected blocks for downstream and upstream transmissions. |
| Poll Interval(s) | The text box displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**. |
| Stop | Click **Stop** to stop port statistic polling. |

### 13.11.4.6 1day DSL Line Performance

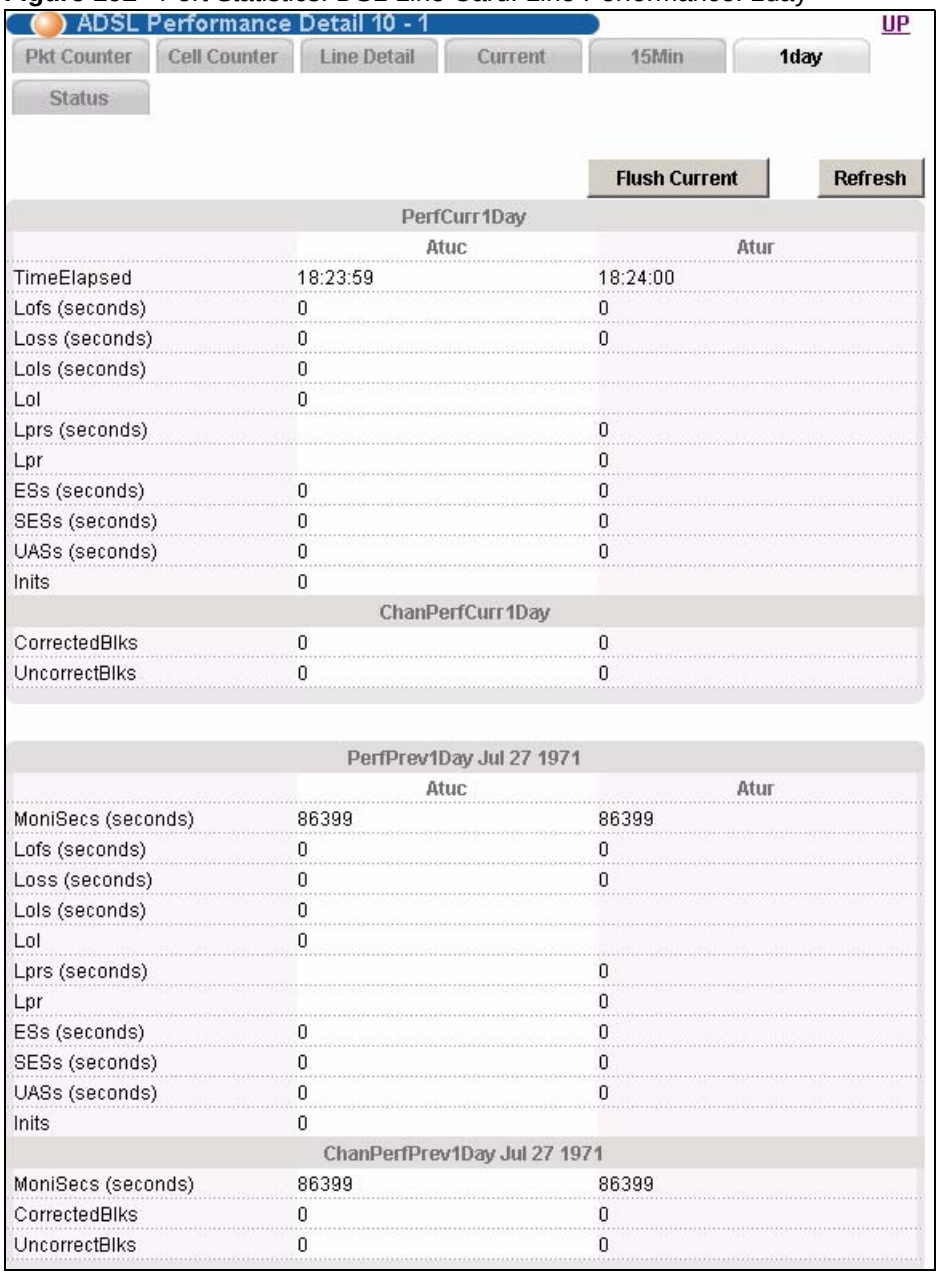
To display line performance counters for the past one day, click the port number in the line card's statistics screen (see Figure 186 on page 318) and click the **1day** tab.

**TimeElapsed** shows how long the port's downstream and upstream connections have been up during the current day.

**MoniSecs (seconds)** shows how long the port's downstream and upstream connections have been up during a previous day.

Refer to Table 146 on page 326 for descriptions of the rest of the fields in this screen.

**Figure 192** Port Statistics: DSL Line Card: Line Performance: 1day

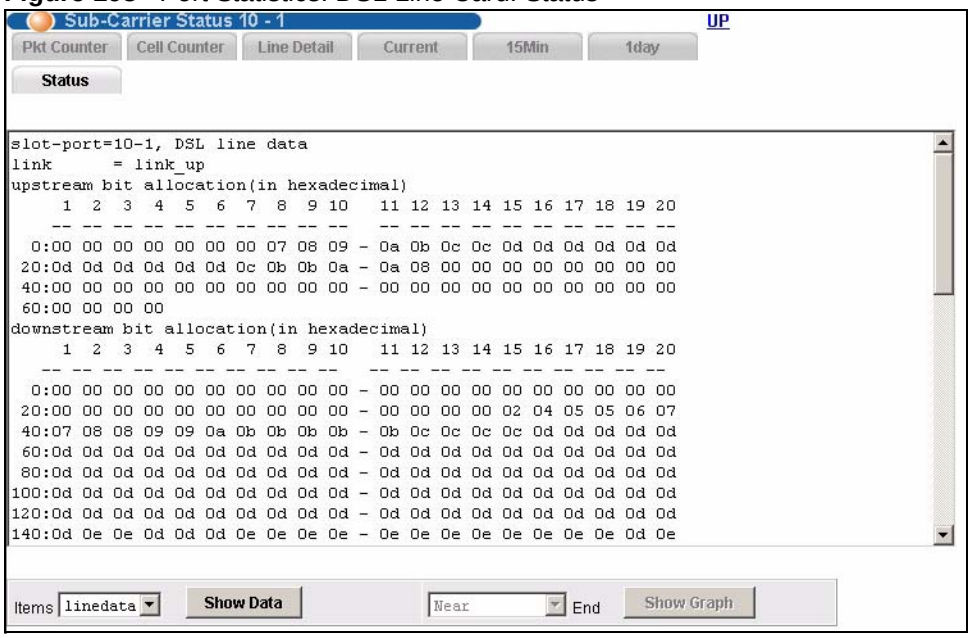



### 13.11.4.7 DSL Line Status

To display line information for an active ADSL line, click the port number in the line card's statistics screen (see Figure 186 on page 318) and click the **Status** tab.

See also Section 31.3.1 on page 640 for details about the line status displays.

**Figure 193** Port Statistics: DSL Line Card: Status




The following table describes the labels in this screen.

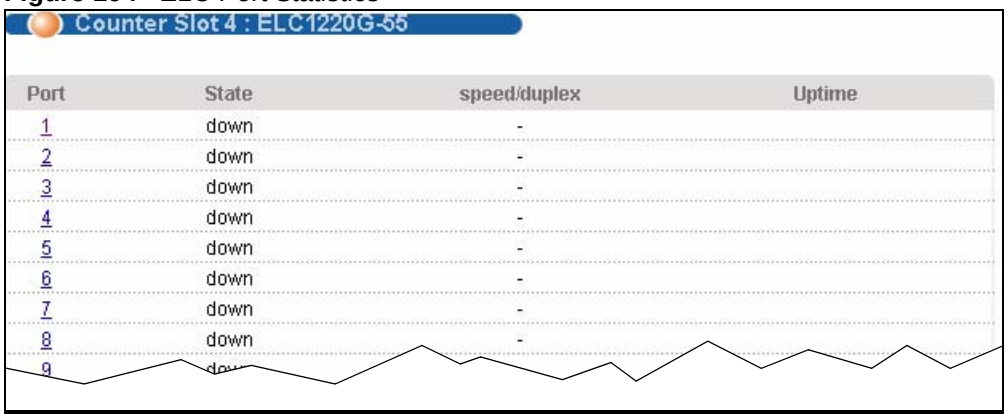
**Table 147** Port Statistics: DSL Line Card: Status

| LABEL | DESCRIPTION |
|---|---|
| Items | Select a type of line information to display<br>**linedata**: Displays an ADSL port's line bit allocation.<br>**linegain**: Displays the line gain of the active ADSL line. Line gain represents the signal input required to compensate for losses in signal strength at different frequencies.<br>**linehlog**: This command displays the loop response using a logarithmic scale. These values can then be used to estimate line characteristics such as the line make-up and length.<br>**lineqln**: Displays the Quiet Line Noise level on a line. This is the rms (root mean square) level of the noise present on the line for a DMT tone when no ADSL or DSL signals are present. It is measured in dBm/Hz. The QLN can be used in analyzing crosstalk.<br>**linetssi**: Displays the TSSI (Transmitter Spectrum Shape Index) of transmission on the specified DSL line. This tests the variation of the actual PSD (Power Spectrum Density) from the specified PSD. |
| End | Select **Near** to display results for the upstream traffic (coming from the subscriber to the line card).<br>Select **Far** to display results for the downstream traffic (going from the line card to the subscriber). |
| Show Graph | Click this to display the line information as a line graph. |

## 13.11.5 ELC Port Statistics

Click the slot ID for an Ethernet line card in the **Port Statistics** screen to view Ethernet port status and statistics.

**Figure 194** ELC Port Statistics




The following table describes the labels in this screen.

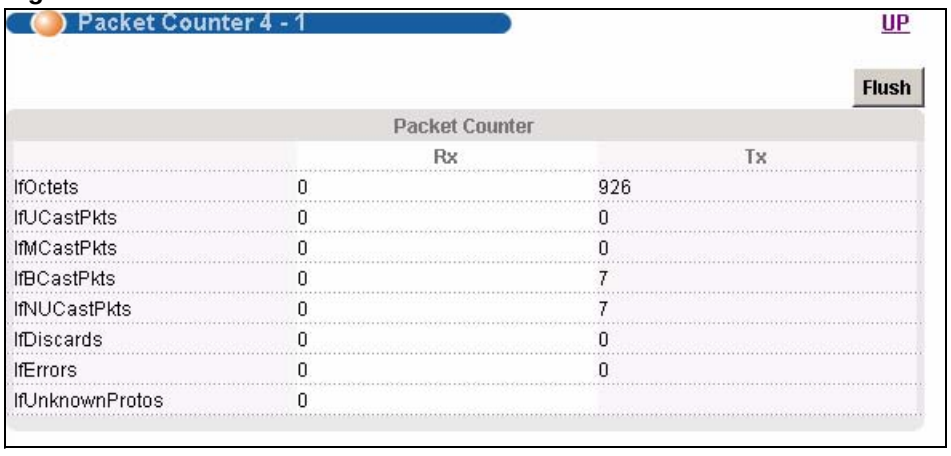
**Table 148** ELC Port Statistics

| LABEL | DESCRIPTION |
|---|---|
| Port | This field displays the slot number. Click one of these links to see detailed Ethernet port statistics. |
| State | This field displays whether the port is connected (**up**) or not (**down**). |
| Speed/Duplex | This field displays the type of Ethernet connection the port has (- displays when the port is not connected).<br>**100/Full** displays when the Ethernet port has a 100 MB full-duplex connection.<br>**100/Half** displays when the Ethernet port has a 100 MB half-duplex connection. |
| Uptime | This field displays how long the port has been running (or connected) since the last time it was started. |
| Poll Interval(s) | The text box displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**. |
| Stop | Click **Stop** to stop port statistic polling. |

## 13.11.6 Detailed ELC Port Statistics

To view detailed port statistics on a selected ELC port, click the port index number in the ELC port statistics screen.

**Figure 195** ELC Port Statistics Details



The following table describes labels in this example.

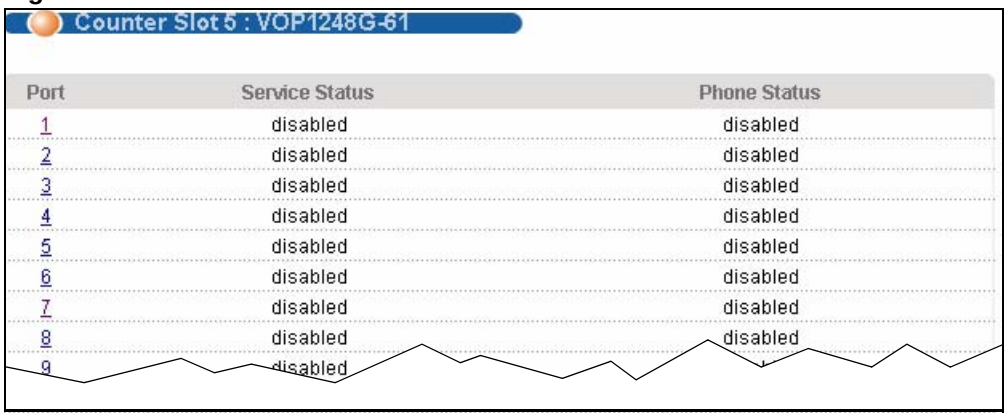
**Table 149** ELC Port Statistics Details

| LABEL | DESCRIPTION |
|---|---|
| Flush | Click **Flush** to clear the counters. |
| Packet Counter | |
| IfOctets | This field displays the number of octets received/transmitted on this port. |
| IfUCastPkts | This field displays the number of unicast packets received/transmitted on this port. |
| IfMCastPkts | This field displays the number of multicast packets received/transmitted on this port. |
| IfBCastPkts | This field displays the number of broadcast packets received/transmitted on this port. |
| IfNUCastPkts | This field displays the number of non-unicast packets received/transmitted on this port. |
| IfDiscard | This field displays the number of received/transmitted packets that were discarded on this port. |
| IfErrors | This field displays the number of packets received/transmitted with errors on this port. |
| IfUnknownProtos | This field displays the number of packets received/transmitted with unknown protocol number on this port. |

## 13.11.7 VOP Port Statistics

Click the slot ID for a VOP card in the **Port Statistics** screen to view port status and statistics.

**Figure 196** VOP Port Statistics



The following table describes the labels in this screen.

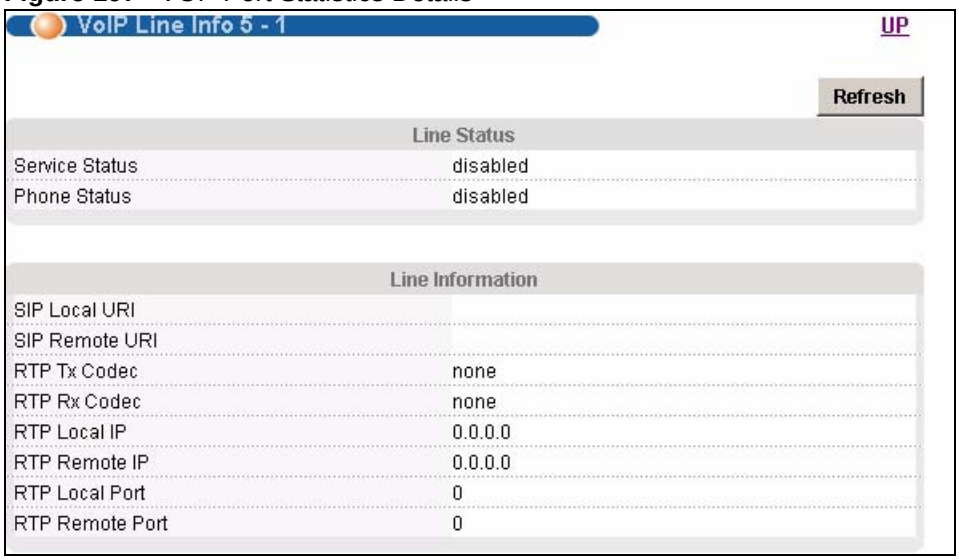
**Table 150** VOP Port Statistics

| LABEL | DESCRIPTION |
|---|---|
| Port | This field displays the port number. Click one of these links to see detailed Ethernet port statistics. |
| Service Status | This field displays the current state of the analog phone port.<br>Possible values are:<br>**Disabled**<br>**Out-of-service**<br>**Idle**<br>**Waiting-for-dialing**<br>**Dialing-out**<br>**Ringing**<br>**Conversation-caller**<br>**Conversation-callee**<br>**Fax/Modem-caller**<br>**Fax/Modem-callee**<br>**Waiting-for-on-hook**<br>**Alerting-off-hook**<br>**Power-cut-down**<br>**Dialing-timeout** |
| Phone Status | This displays the state of the analog phone connected to the port.<br>The possible values are:<br>**Disabled**<br>**On-hook**<br>**Off-hook**<br>**Ringing**<br>**Testing**<br>**Power-cut-down**<br>**Fault**<br>**Bad**<br>**Uninitialized** |

## 13.11.8 Detailed VOP Port Statistics

To view detailed port statistics on a selected VOP port, click the port index number in the VOP port statistics screen.

**Figure 197** VOP Port Statistics Details




The following table describes labels in this example.

**Table 151** VOP Port Statistics Details

| LABEL | DESCRIPTION |
|---|---|
| Refresh | Click **Refresh** to update this screen. |
| Line Status | |
| Service Status | This field displays the current state of the analog phone port.<br>Possible values are:<br>**Disabled**<br>**Out-of-service**<br>**Idle**<br>**Waiting-for-dialing**<br>**Dialing-out**<br>**Ringing**<br>**Conversation-caller**<br>**Conversation-callee**<br>**Fax/Modem-caller**<br>**Fax/Modem-callee**<br>**Waiting-for-on-hook**<br>**Alerting-off-hook**<br>**Power-cut-down**<br>**Dialing-timeout** |
| Phone Status | This displays the state of the analog phone connected to the port.<br>The possible values are:<br>**Disabled**<br>**On-hook**<br>**Off-hook**<br>**Ringing**<br>**Testing**<br>**Power-cut-down**<br>**Fault**<br>**Bad**<br>**Uninitialized** |
| Line Information | |

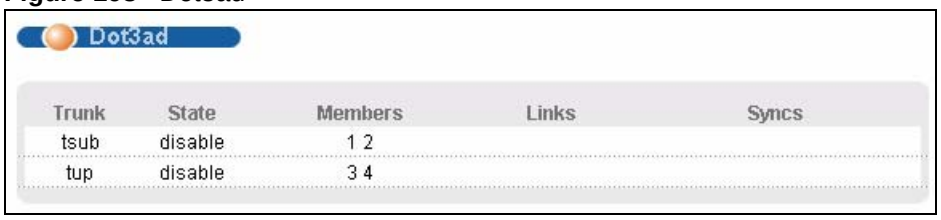
**Table 151** VOP Port Statistics Details (continued)

| LABEL | DESCRIPTION |
|---|---|
| SIP Local URI | This is the Universal Resource Indicator of the port.<br>If a local URI is “aaa@bbb”, “aaa” is the telephone number configured in the **VoIP** > **VoIP Port Setup** > **Port Edit** screen, and “bbb” is the domain name of the SIP server configured in the **VoIP > SIP Profile** screen. |
| SIP Remote URI | This shows the URI of the remote VoIP device (the person at the other end of the line). |
| RTP Tx Codec | This shows the voice codec used for transmitting data. |
| RTP Rx Codec | This shows the voice codec used for receiving data. |
| RTP Tx Payload Type | This shows the voice codec currently used for transmitting voice on this port. The supported codecs can be configured in each DSP profile (in the **VoIP > DSP Profile** screen). The value displayed here depends on the result of the codec negotiation between the system and the remote VoIP device.<br>Possible values are:<br>G711a: **0**<br>G711µ: **8**<br>G723: **4**<br>G729: **18**<br>T.38: **32**<br>G726-16: **96**<br>G726-24: **97**<br>G726-32: **98**<br>G726-40: **99** |
| RTP Rx Payload Type | This shows the voice codec currently used for receiving voice on this port. The supported codecs can be configured in each DSP profile (in the **VoIP > DSP Profile** screen). The value displayed here depends on the result of the codec negotiation between the system and the remote VoIP device.<br>Possible values are:<br>G711a: **0**<br>G711mu: **8**<br>G723: **4**<br>G729: **18**<br>T.38: **32**<br>G726-16: **96**<br>G726-24: **97**<br>G726-32: **98**<br>G726-40: **99** |
| RTP Local IP | This is the local IP address. |
| RTP Remote IP | This is the remote IP address. |
| RTP Local Port | This is the local port used for SIP. |
| RTP Remote Port | This is the port on the remote device used for SIP. |

## 13.12 Dot3ad

Click **Statistics** > **Dot3ad** in the navigation panel to display the following screen. Use this screen to view IEEE 802.3ad link aggregation settings.

**Figure 198** Dot3ad




The following table describes the labels in this screen.

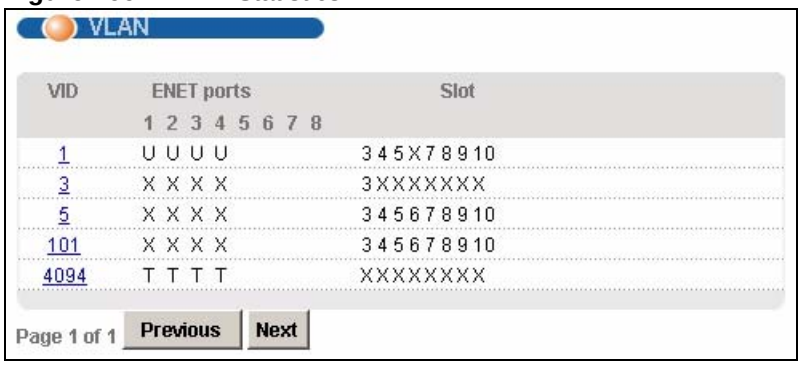
**Table 152** Dot3ad

| LABEL | DESCRIPTION |
|---|---|
| Trunk | Sub refers to the subtending ports while up refers to the uplink ports. |
| State | This field displays whether link aggregation is activated on the ports. |
| Members | This field displays the name of the link aggregation group. |
| Links | These are the ports you have configured to be in the trunk group. |
| Syncs | These are the ports that are currently transmitting data as one logical link in this trunk group. |

## 13.13 VLAN Statistics

Click **Statistics** > **VLAN** in the navigation panel to display the following screen. Use this screen to view current VLAN settings.

**Figure 199** VLAN Statistics




The following table describes the labels in this screen.

**Table 153** VLAN Statistics

| LABEL | DESCRIPTION |
|---|---|
| VID | This field displays the VLAN ID. |
| ENET ports 1~8 | This column displays the VLAN's settings for the MSC1000G's Ethernet ports.<br>ENET port 1 and 2 are subtending ports 1 and 2.<br>ENET port 3 and 4 are uplink ports 1 and 2.<br>ENET ports 5~8 do not apply.<br>A tagged port is marked as **T**, an untagged port is marked as **U** and ports not participating in a VLAN are marked as **X**. |
| Slot | This column displays the VLAN's settings for the line cards (identified by slot). A number displays for each line card that is a member of the VLAN. An "X" displays for each line card that is not a member of the VLAN. |

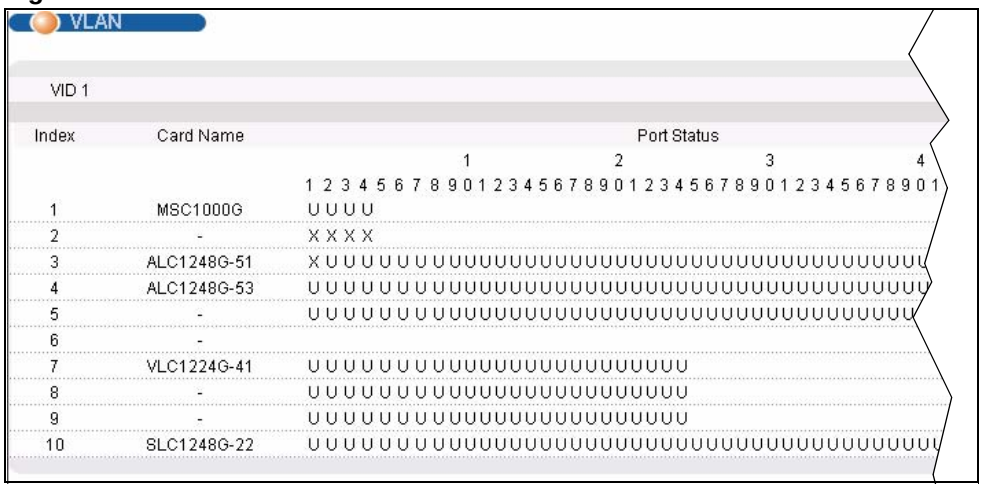
**Table 153** VLAN Statistics (continued)

| LABEL | DESCRIPTION |
|---|---|
| Page X of X | This identifies which page of information is displayed and the total number of pages of information. |
| Previous/Next | Click one of these buttons to show the previous/next screen if all of the information cannot be seen in one screen. |

## 13.13.1 VLAN Port Statistics

To view VLAN port status, click a VID in the **VLAN** screen.

**Figure 200** VLAN: Port Status




The following table describes the labels in this screen.

**Table 154** VLAN: Port Status

| LABEL | DESCRIPTION |
|---|---|
| VID X | This field displays the VLAN ID. |
| Index | This field displays the index number. |
| Card Name | This field displays the name of the line card in this VLAN. |
| Port Status | This field displays the port status in this VLAN. A tagged port is marked as **T**, an untagged port is marked as **U** and ports not participating in a VLAN are marked as **X**. |

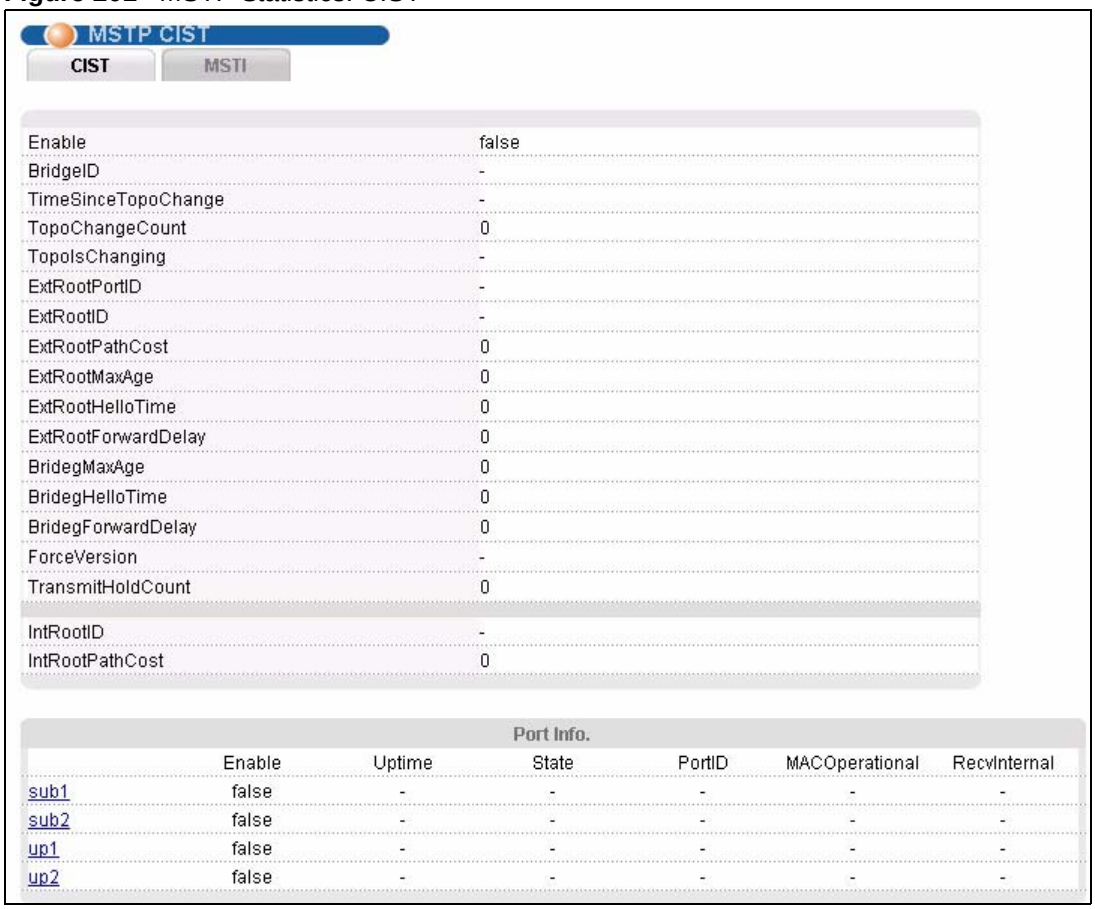
# 13.14 MSTP Statistics

Use the MSTP statistics screen to displays the status and statistics for the device's MSTP CIST (Common and Internal Spanning Tree) and MSTI ((Multiple Spanning Tree Instance) settings. Refer to Section 14.9 on page 352 for more background information.

## 13.14.1 MSTP CIST Statistics

Click **Statistics** > **MSTP** in the navigation panel to display the **MSTP CIST** statistics screen.

**Figure 201** MSTP Statistics: CIST




The following table describes the labels in this screen.

**Table 155** MSTP Statistics: CIST

| LABEL | DESCRIPTION |
|---|---|
| Enable | This field displays whether MSTP is activated on the device. |
| BridgeID | This is the unique identifier for this bridge, consisting of bridge priority plus MAC address. This ID is the same in **ExtRootID** if this device is the root switch. |
| TimeSinceTopoChange | This is the time since the spanning tree was last reconfigured. |
| TopoChangeCount | This is the number of times the spanning tree has been reconfigured. |
| TopoIsChanging | The spanning tree is currently reconfiguring if “True” displays. |
| ExtRootPortID | This is the unique identifier for the port that connects to the external root bridge. |
| ExtRootID | This is the unique identifier for the external root bridge, consisting of bridge priority plus MAC address. |
| ExtRootPathCost | This is the path cost of the link to the root bridge. |
| ExtRootMaxAge | This is the maximum time (in seconds) the spanning tree can wait without receiving a configuration message before attempting to reconfigure on the root port. |
| ExtRootHelloTime | This is the time interval (in seconds) at which the root transmits a configuration message through the root port. The root bridge determines the Hello Time, Max Age and Forward Delay. |

**Table 155** MSTP Statistics: CIST (continued)

| LABEL | DESCRIPTION |
|---|---|
| ExtRootForwardDelay | This is the time (in seconds) the root bridge will wait before changing states (that is, listening to learning or learning to forwarding) on the root port. Each change in states requires the forward delay time before the change. |
| BridegMaxAge | This is the maximum time (in seconds) the root bridge can wait without receiving a configuration message before attempting to reconfigure. |
| BridegHelloTime | This is the time interval (in seconds) at which the root switch transmits a configuration message. The root bridge determines the Hello Time, Max Age and Forward Delay. |
| BridegForwardDelay | This is the time (in seconds) the root switch will wait before changing states (that is, listening to learning to forwarding). |
| ForceVersion | This is the version of spanning tree protocol the device is using (**MSTP** or **RSTP**). The system will send BPDUs of the specified spanning tree version. |
| TransmitHoldCount | This is the number of BPDUs that are allowed to be sent before pausing for 1 second. |
| IntRootID | This field displays the ID of the root switch in a region. |
| IntRootPathCost | This field displays path cost to the internal root bridge. |
| Port Info. | |
| sub1~up2 | These are the MSC1000G's subtending and uplink Ethernet ports. Click a link to see detailed MSTP CIST statistics for that port. |
| Enable | This field displays whether a port is active or not. |
| Uptime | This field displays the time the port is running. |
| State | This field displays the STP status on this port. |
| PortID | This field displays port ID. |
| MACOperational | This field displays true when the link is up or false if the link is not up. |
| RecvInternal | This field displays whether the BPDU received was transmitted by a bridge in the same region. |

## 13.14.2 MSTP CIST Statistics: Port Details

Click a port's link in the **Statistics** > **MSTP** screen to see detailed MSTP CIST statistics for that port.

**Figure 202** MSTP Statistics: CIST: Port Details

| Port Info. enet1 | | | |
|---|---|---|---|
| Enable | - | Uptime | - |
| State | - | PortID | - |
| DsgBridgeID | - | DsgPortID | - |
| ExtPortPathCost | 0 | ExtRootID | - |
| ExtRootPathCost | 0 | AdminEdgePort | - |
| OperEdgePort | - | MACOperational | - |
| AdminP2PLink | - | OperP2PLink | - |
| PortHelloTime | 0 | RecvInternal | - |
| RxStpCfgBPDU | 0 | RxStpTcnBPDU | 0 |
| RxRstpBPDU | 0 | RxMstpBPDU | 0 |
| IntPortPathCost | 0 | IntRootID | - |

The following table describes the labels in this screen.

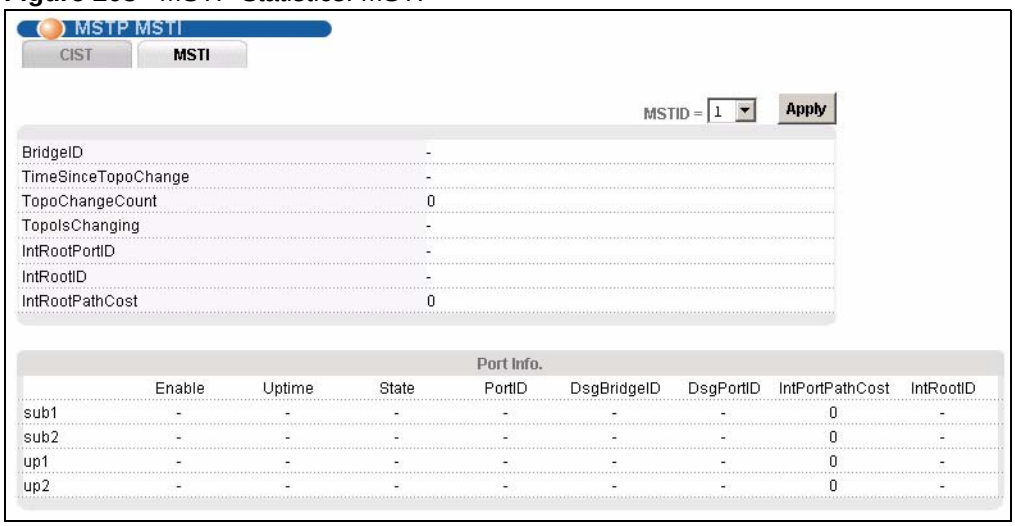
**Table 156** MSTP Statistics: CIST: Port Details

| LABEL | DESCRIPTION |
|---|---|
| Enable | This field displays whether MSTP is activated on the device. |
| Uptime | This field displays the time the port is running. |
| State | This field displays the STP status on this port. |
| PortID | This field displays port ID. |
| DsgBridgeID | This is the unique identifier for the bridge in the LAN segment to which this bridge belongs that has the lowest path cost to reach the root bridge, consisting of bridge priority plus MAC address. |
| DsgPortID | This is the port on the designated bridge that has the lowest path cost to reach the root bridge, consisting of bridge priority. |
| ExtPortPathCost | This field displays the path cost of this port to an external bridge (a bridge in a different MST region). |
| ExtRootID | This is the unique identifier for the external root bridge, consisting of bridge priority plus MAC address. |
| ExtRootPathCost | This is the path cost of the link to the root bridge. |
| AdminEdgePort | An edge port connects to a non-STP device (such as a computer or a hub). This field displays whether or not an administrator has set this port as an edge port. |
| OperEdgePort | This field displays whether or not the spanning tree network has determined this port to be an edge port. |
| MACOperational | This field displays true when the link is up or false if the link is not up. |
| AdminP2PLink | This field displays whether or not an administrator has set this port as a point-to-point link to the neighbor switch. |
| OperP2PLink | This field displays whether or not the spanning tree network has determined this port to be a point-to-point link to the neighbor switch. |
| PortHelloTime | This is the time interval (in seconds) at which the port transmits a configuration message. |
| RecvInternal | This field displays whether the BPDU received was transmitted by a bridge in the same region. |
| RxStpCfgBPDU | This is the number of legacy STP configuration BPDUs that have been received on this port. |
| RxStpTcnBPDU | This is the total number of legacy STP topology change notification BPDUs that have been received on this port. |
| RxRstpBPDU | This is the number of RSTP BPDUs that have been received on this port. |
| RxMstpBPDU | This is the number of MSTP BPDUs that have been received on this port. |
| IntPortPathCost | This is the path cost to the internal root bridge. |
| IntRootID | This is the ID of the internal root bridge. |

## 13.14.3 MSTP MSTI Statistics

Click **Statistics** > **MSTP** > **MSTI** to display the **MSTP MSTI** statistics screen. Use this screen to view the port status of a selected spanning tree instance.

**Figure 203** MSTP Statistics: MSTI




The following table describes the labels in this screen.

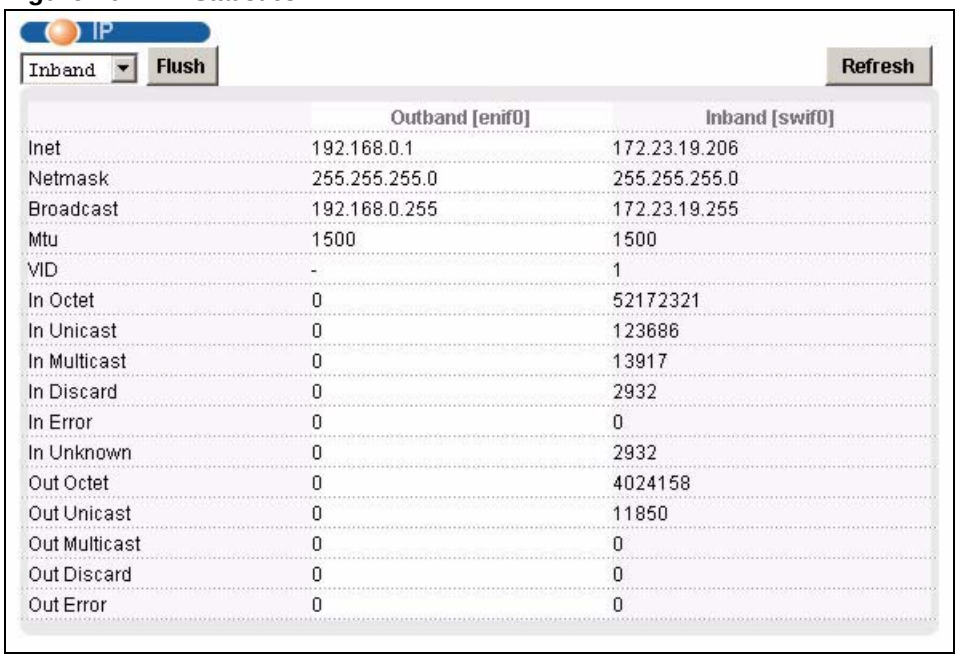
**Table 157** MSTP Statistics: MSTI

| LABEL | DESCRIPTION |
|---|---|
| MSTID | Select an MSTI number and click **Apply** to display the port status for that spanning tree instance. |
| BridgeID | This is the unique identifier for this bridge, consisting of bridge priority plus MAC address. |
| TimeSinceTopoChange | This is the time since the spanning tree was last reconfigured. |
| TopoChangeCount | This is the number of times the spanning tree has been reconfigured. |
| TopoIsChanging | The spanning tree is currently reconfiguring if “True” displays. |
| IntRootPathCost | This field displays path cost to the internal root bridge. |
| IntRootID | This field displays the ID of the root switch in a region. |
| IntPortPathCost | This is the path cost to the internal root bridge. |
| Port Info. | |
| sub1~up2 | These are the MSC1000G’s subtending and uplink Ethernet ports. |
| Enable | This field displays whether a port is active or not. |
| Uptime | This field displays the time the port is running. |
| State | This field displays the STP status on this port. |
| PortID | This field displays port ID. |
| DsgBridgeID | This is the unique identifier for the bridge in the LAN segment to which this bridge belongs that has the lowest path cost to reach the root bridge, consisting of bridge priority plus MAC address. |
| DsgPortID | This is the port on the designated bridge that has the lowest path cost to reach the root bridge, consisting of bridge priority. |
| IntRootPathCost | This field displays path cost to the internal root bridge. |
| IntRootID | This field displays the ID of the root switch in a region. |

# 13.15 IP Statistics

To view management IP settings and statistics, click **Statistics** > **IP** in the navigation panel.

**Figure 204** IP Statistics




The following table describes the labels in this screen.

**Table 158** IP Statistics

| LABEL | DESCRIPTION |
|---|---|
| Flush | Click **Flush** to reset the counters for the selected port. |
| Refresh | Click **Refresh** to update this screen. |
| Inet | This field displays the management IP address. |
| Netmask | This field displays the subnet mask for the IP address above. |
| Broadcast | This field displays the broadcast address. |
| Mtu | This field displays the size of the Maximum Transmission Unit (MTU). |
| In Octet | This field displays the number of octets received on this port. |
| In Unicast | This field displays the number of unicast packets received on this port. |
| In Multicast | This field displays the number of multicast packets received on this port. |
| In Discard | This field displays the number of discarded packets received on this port. |
| In Error | This field displays the number of errored packets received on this port. |
| In Unknown | This field displays the number of packets with an unknown source received on this port. |
| Out Octet | This field displays the number of octets transmitted on this port. |
| Out Unicast | This field displays the number of unicast packets transmitted on this port. |
| Out Multicast | This field displays the number of multicast packets transmitted on this port. |
| Out Discard | This field displays the number of discarded packets transmitted on this port. |

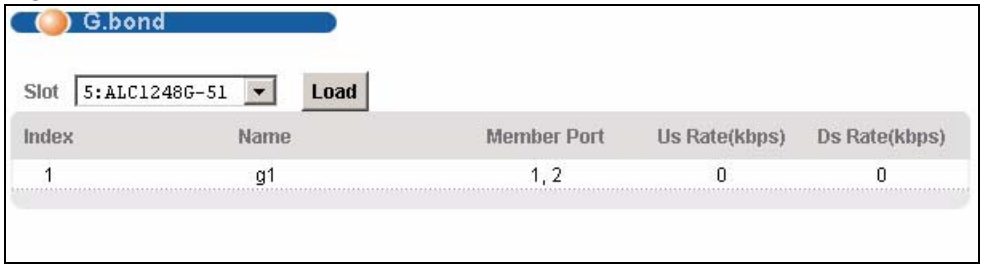
**Table 158** IP Statistics (continued)

| LABEL | DESCRIPTION |
|---|---|
| Out Error | This field displays the number of errored packets transmitted on this port. |
| Out Unknown | This field displays the number of packets with an unknown source transmitted on this port. |

## 13.16 G.bond Statistics

To view G.bond settings and statistics, click **Statistics** > **G.bond** in the navigation panel.

**Figure 205** G.bond Statistics




The following table describes the labels in this screen.

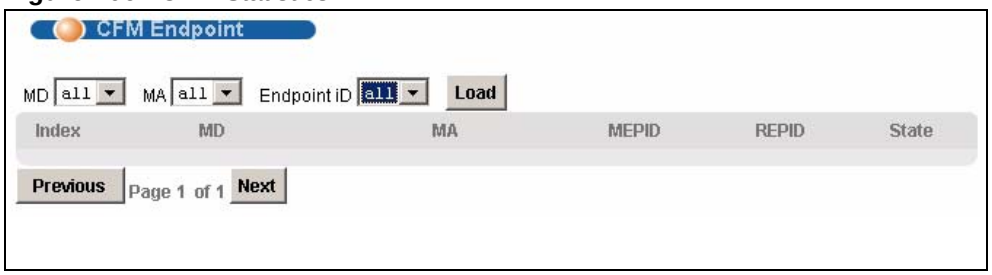
**Table 159** IP Statistics

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the slot number of a line card. Click **Load** to show G.bond related statistics for the selected line card. |
| Index | This shows the index number of a DSL line bundle for which G.bond is configured. |
| Name | This shows the descriptive name previously given to the DSL line bundle for which G.bond is configured. |
| Member Port | This shows the ports allocated to the DSL lines in this G.bond bundle. |
| Us Rate(kbps) | This shows the aggregate upstream data transfer rate (in Kbps) for this DSL line bundle. |
| Ds Rate(kbps) | This shows the aggregate downstream data transfer rate (in Kbps) for this DSL line bundle. |

## 13.17 CFM Endpoint Statistics

To view CFM Endpoint settings and statistics, click **Statistics** > **CFM** in the navigation panel.

**Figure 206** CFM Statistics



The following table describes the labels in this screen.

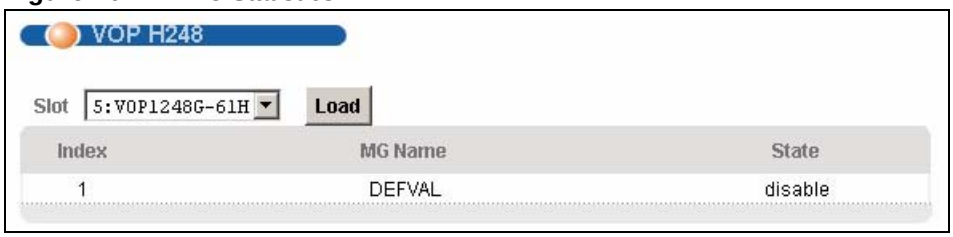
**Table 160** CFM Statistics

| LABEL | DESCRIPTION |
|---|---|
| MD, MA, Endpoint ID | Use the drop-down boxes to select an MD, MA, and end point ID for which you want to see a CFM statistics report. |
| Load | Click **Load** to display the available CFM end points based on your selected criteria. |
| Index | This field displays the index number of a CFM end point. Click an index ID to view detailed information on the end point. |
| MD | This field displays the MD name to which an end point belongs. |
| MA | This field displays the MA name to which an end point belongs. |
| EPID | This field displays an end point ID. |
| REPID | This field displays a list of associated remote end point IDs which have had a CFM test. |
| State | This field displays the CFM end point connection status. **Active** means no connectivity fault has been found. **Error** means a connectivity fault has been found on this port (end point). |
| Previous, Next | Click **Previous** or **Next** to respectively go to the previous or the next page if there is more than one page of information on CFM end points. |

## 13.18 H248 Statistics

To view a H.248 VOP card's list of media gateways and their status, click **Statistics** > **H248** in the navigation panel.

**Figure 207** H248 Statistics




The following table describes the labels in this screen.

**Table 161** H248 Statistics

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the slot number of a H.248 VOP card. Click **Load** to show the card's list of media gateways and their status. |
| Index | This shows the index number of a media gateway configured for the H.248 VOP card. |
| MG Name | This is the name of the media gateway. |
| State | This displays the media gateway's current status (**registering**, **registered**, or **disconnected**). |

# 13.19 Proxy Server Statistics

To view a SIP VOP card's list of SIP proxy servers and their status, click **Statistics** > **Proxy Server** in the navigation panel.

**Figure 208** Proxy Server Statistics

The following table describes the labels in this screen.

**Table 162** Proxy Server Statistics

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the slot number of a SIP VOP card. Click **Load** to show the card's list of SIP proxy servers and their status. |
| SIP proxy server IP/domain name | This field displays the IP address or domain name of the outbound proxy SIP server. |
| Port | This field displays the SIP outbound server's listening port number. |
| State | This displays the SIP proxy server's current status (**alive**, **loss**, or **unknown**). |

# 14

# Switch Screens

This chapter describes the screens you use to configure Ethernet ports, multicast VLAN and global switch parameters such as GARP, link aggregation, priority queues and queuing method.

## 14.1 Ethernet Port Trunking

Ethernet port trunking lets you aggregate the Ethernet ports into one logical link. The switch uses MAC-based load balancing which analyzes a packet's source and destination MAC addresses to distribute the load between the two Ethernet ports when uplinking to the remote switch.

The remote switch must also support Ethernet port trunking. The load-balancing method, however, does not have to be the same as on this switch.

The two uplink ports or two subtending ports must be connected to a single remote switch when port trunking is enabled.

## 14.2 Dynamic Link Aggregation

The MSC1000G adheres to the IEEE 802.3ad standard for static and dynamic (LACP) port trunking.

The MSC1000G supports the link aggregation IEEE 802.3ad standard. This standard describes the Link Aggregate Control Protocol (LACP), which is a protocol that dynamically creates and manages trunk groups.

When you enable LACP link aggregation on a port, the port can automatically negotiate with the ports at the remote end of a link to establish trunk groups. LACP also allows port redundancy, that is, if an operational port fails, then one of the "standby" ports become operational without user intervention. Please note that:

- You must connect all ports point-to-point to the same Ethernet switch and configure the ports for LACP trunking.
- LACP only works on full-duplex links.
- All ports in the same trunk group must have the same media type, speed, duplex mode and flow control settings.

Configure trunk groups or LACP before you connect the Ethernet switch to avoid causing network topology loops.

## 14.3 Link Aggregation ID

LACP aggregation ID consists of the following information[2]:

**Table 163** Link Aggregation ID: Local Switch

| SYSTEM PRIORITY | MAC ADDRESS | KEY | PORT PRIORITY | PORT NUMBER |
|---|---|---|---|---|
| 0000 | 00-00-00-00-00 | 0000 | 00 | 0000 |

**Table 164** Link Aggregation ID: Peer Switch

| SYSTEM PRIORITY | MAC ADDRESS | KEY | PORT PRIORITY | PORT NUMBER |
|---|---|---|---|---|
| 0000 | 00-00-00-00-00 | 0000 | 00 | 0000 |

## 14.4 Queuing Overview

Queuing is used to help solve performance degradation when there is network congestion.

Queuing algorithms allow switches to maintain separate queues for packets from each individual source or flow and prevent a source from monopolizing the bandwidth.

The switch has eight physical queues, Q0 to Q7. Q7 has the highest priority and Q0 has the lowest.

**Table 165** Physical Queue Priority

| QUEUE | PRIORITY |
|---|---|
| Q7 | 8 (Highest) |
| Q6 | 7 |
| Q5 | 6 |
| Q4 | 5 |
| Q3 | 4 |
| Q2 | 3 |
| Q1 | 2 |
| Q0 | 1 (Lowest) |

2. Port Priority and Port Number are 0 as it is the aggregator ID for the trunk group, not the individual port.

### 14.4.1 Strict Priority Queuing (SPQ)

Strict Priority Queuing (SPQ) services queues based on priority only. As traffic comes into the switch, traffic on the highest priority queue, Q7 is transmitted first. When that queue empties, traffic on the next highest-priority queue, Q6 is transmitted until Q6 empties, and then traffic is transmitted on Q5 and so on. If higher priority queues never empty, then traffic on lower priority queues never gets sent. SPQ does not automatically adapt to changing network requirements.

### 14.4.2 Weighted Round Robin Scheduling (WRR)

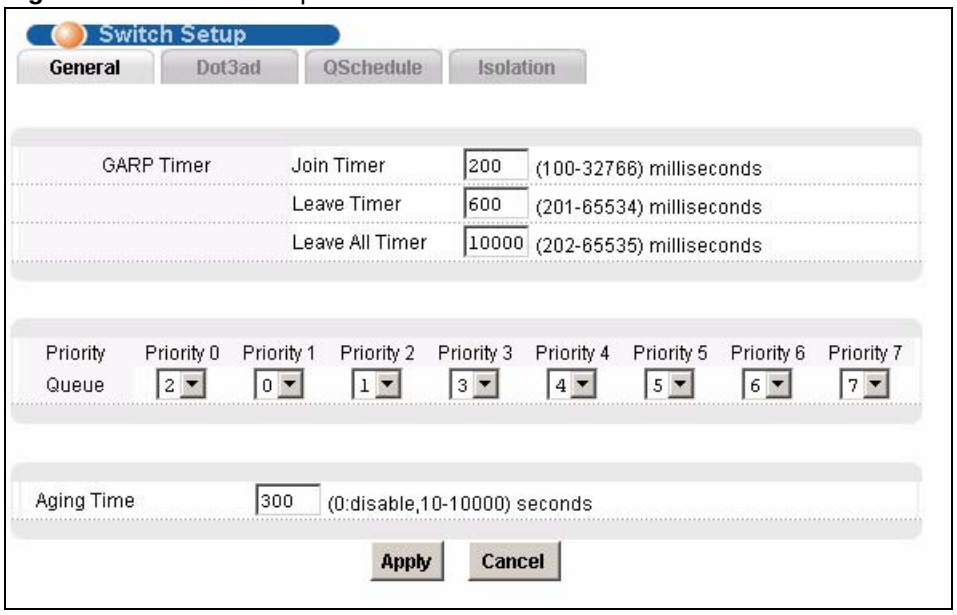
Round Robin Scheduling services queues on a rotating basis and is activated only when a port has more traffic than it can handle. A queue is a given an amount of bandwidth irrespective of the incoming traffic on that port. This queue then moves to the back of the list. The next queue is given an equal amount of bandwidth, and then moves to the end of the list; and so on, depending on the number of queues being used. This works in a looping fashion until a queue is empty.

Weighted Round Robin Scheduling (WRR) uses the same algorithm as round robin scheduling, but services queues based on their priority and queue weight (the number you configure in the queue weight fields) rather than a fixed amount of bandwidth. WRR is activated only when a port has more traffic than it can handle. Queues with larger weights get more service than queues with smaller weights. This queuing mechanism is highly efficient in that it divides any available bandwidth across the different traffic queues and returns to queues that have not yet emptied.

## 14.5 Switch Setup General Screen

Click **Switch** > **Switch Setup** in the navigation panel to display the screen as shown.

**Figure 209** Switch Setup General



The following table describes the labels in this screen.

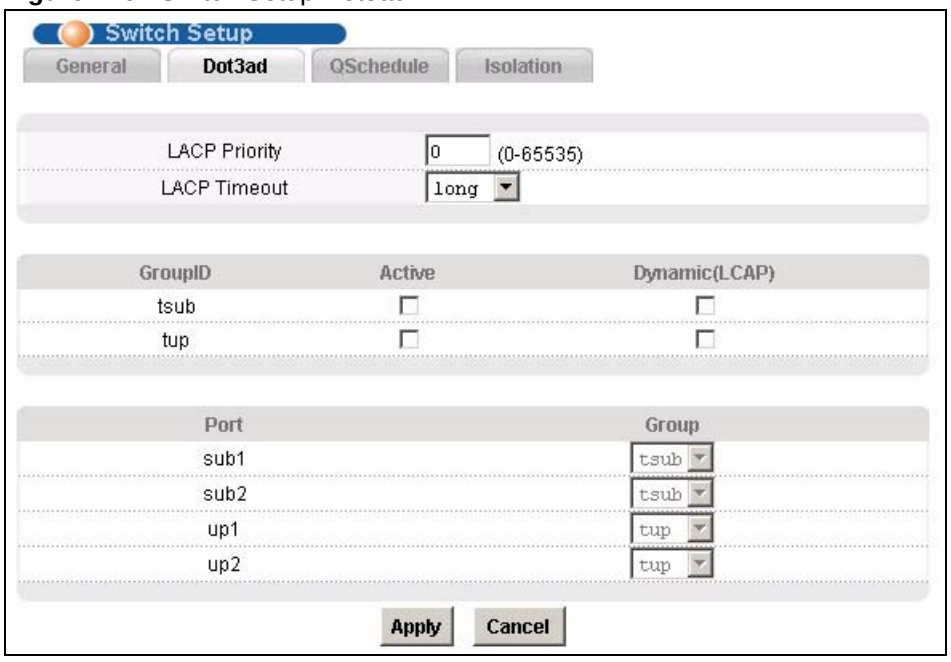
**Table 166** Switch Setup General

| LABEL | DESCRIPTION |
|---|---|
| GARP Timer:<br>Switches join VLANs by making a declaration. A declaration is made by issuing a Join message using GARP. Declarations are withdrawn by issuing a Leave message. A Leave All message terminates all registrations. GARP timers set declaration timeout values.<br>Refer to Chapter 16 on page 395 for more background information. | |
| Join Timer | Join Timer sets the duration of the Join Period timer for GVRP in milliseconds. Each port has a Join Period timer. The allowed Join Time range is between 100 and 65535 milliseconds; the default is 200 milliseconds. See the chapter on VLAN setup for more background information. |
| Leave Timer | Leave Timer sets the duration of the Leave Period timer for GVRP in milliseconds. Each port has a single Leave Period timer. Leave Time must be two times larger than Join Timer; the default is 600 milliseconds. |
| Leave All Timer | Leave All Timer sets the duration of the Leave All Period timer for GVRP in milliseconds. Each port has a single Leave All Period timer. Leave All Timer must be larger than Leave Timer; the default is 1000 milliseconds. |
| Priority Queue Assignment<br>IEEE 802.1p defines up to 8 separate traffic types by inserting a tag into a MAC-layer frame that contains bits to define class of service. Frames without an explicit priority tag are given the default priority of the ingress port. Use the drop-down list boxes to configure the priority level-to-physical queue mapping.<br>The system has 8 physical queues that you can map to the 8 priority levels. On the switch, traffic assigned to higher index queues gets through faster while traffic in lower index queues is dropped if the network is congested. | |
| Priority Levels (The following descriptions are based on the traffic types defined in the IEEE 802.1d standard (which incorporates IEEE 802.1p). | |
| Priority 7 | Typically used for network control traffic such as router configuration messages. |
| Priority 6 | Typically used for voice traffic that is especially sensitive to jitter (jitter is the variations in delay). |
| Priority 5 | Typically used for video that consumes high bandwidth and is sensitive to jitter. |
| Priority 4 | Typically used for controlled load, latency-sensitive traffic such as SNA (Systems Network Architecture) transactions. |
| Priority 3 | Typically used for “excellent effort” or better than best effort and would include important business traffic that can tolerate some delay. |
| Priority 2 | This is for “spare bandwidth”. |
| Priority 1 | This is typically used for non-critical “background” traffic such as bulk transfers that are allowed but that should not affect other applications and users. |
| Priority 0 | Typically used for best-effort traffic. |
| Aging Time | Enter a time from 10 to 10,000 seconds. This is how long all dynamically learned MAC addresses remain in the MAC address table before they age out (and must be relearned). Enter 0 to disable the aging out of MAC addresses.<br>This setting applies to both the MSC and any installed ELCs. |
| Apply | Click **Apply** to save the changes in this screen to the system’s volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

# 14.6 Switch Setup Dot3ad Screen

Click **Switch** > **Switch Setup** > **Dot3ad** to display the screen as shown.

**Figure 210** Switch Setup Dot3ad




The following table describes the labels in this screen.

**Table 167** Switch Setup Dot3ad

| LABEL | DESCRIPTION |
|---|---|
| LACP Priority | Type a number between 1 and 65,535 for the LACP system priority. The switch with the lowest system priority (and lowest port number if system priority is the same) becomes the LACP “server”. The LACP “server” controls the operation of LACP setup. Enter a number to set the priority of an active port using Link Aggregate Control Protocol (LACP). The smaller the number, the higher the priority level. |
| LACP Timeout | LACP timeout is the time interval between the individual port exchanges of LACP packets in order to check that the peer port in the trunk group is still up. If a port does not respond after three tries, then it is deemed to be “down” and is removed from the trunk. Set a short timeout (one second) for busy trunked links to ensure that disabled ports are removed from the trunk group as soon as possible. Select either short (1 second) or long (30 seconds). |
| Group ID | This column displays the names of the trunk groups for the management switch card’s Ethernet ports. **tsub** is for the management switch card’s subtending ports and **tup** is for the management switch card’s uplink ports. |
| Active | Select this check box to turn on a trunk group. |
| Dynamic(LCAP) | Select this check box to use Link Aggregate Control Protocol (LACP), to dynamically create and manage the trunk group. |
| Port | This column lists the management switch card’s Gigabit Ethernet interfaces. |
| Group | This column displays to which trunk group an MSC1000G Gigabit Ethernet interface belongs. |

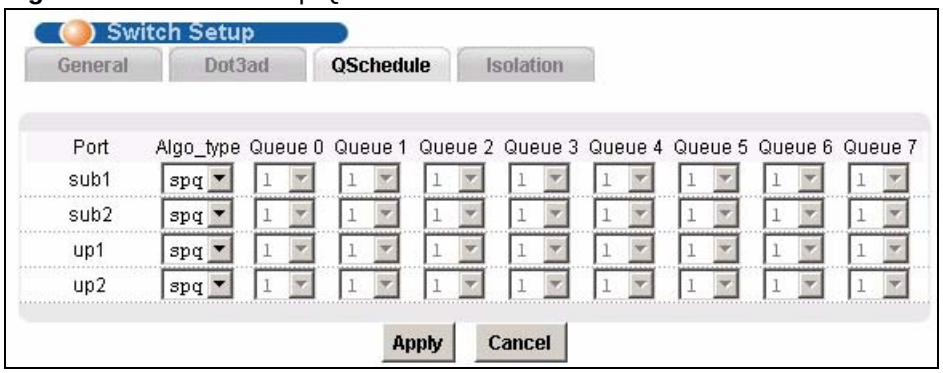
**Table 167** Switch Setup Dot3ad (continued)

| LABEL | DESCRIPTION |
|---|---|
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

## 14.7 Switch Setup QSchedule Screen

Click **Switch** > **Switch Setup** > **QSchedule** to display the screen as shown.

**Figure 211** Switch Setup QSchedule




The following table describes the labels in this screen.

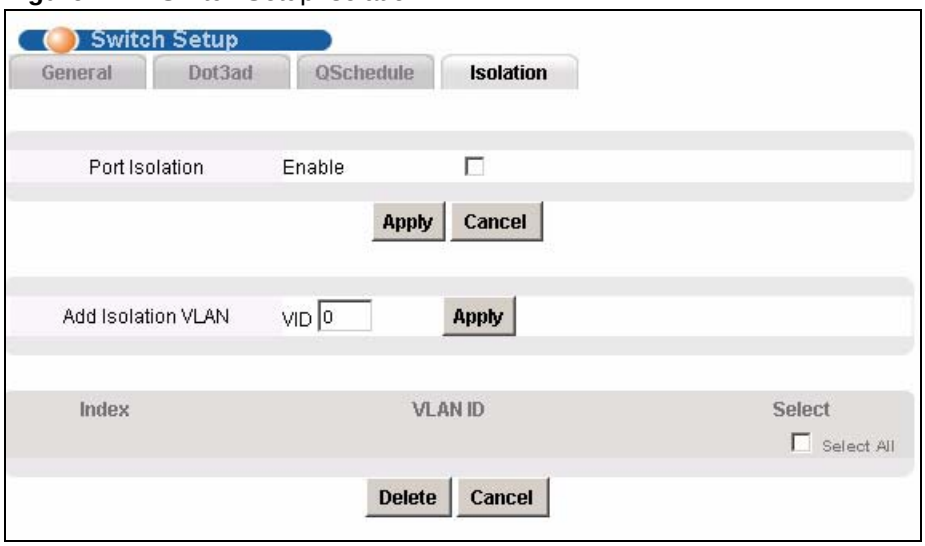
**Table 168** Switch Setup QSchedule

| LABEL | DESCRIPTION |
|---|---|
| Port | This column lists the management switch card's Gigabit Ethernet interfaces. |
| Algo_Type | Use this field to set a Gigabit Ethernet interface's queuing algorithm. If trunking is enabled, you set this for one interface and it applies to the whole trunk group.<br>Select **spq** to use Strict Priority Queuing (SPQ). SPQ services queues based on priority only. When the highest priority queue empties, traffic on the next highest-priority queue begins.<br>Select **wrr** to use Weighted Round Robin (WRR) Scheduling. WRR services queues on a rotating basis based on their queue weight (the number you configure in the queue weight fields). Queues with larger weights get more service than queues with smaller weights. |
| Queue 0~7 | These fields apply when you select the **wrr** queuing algorithm in the **Algo_Type** field.<br>Use these fields to set the priority weight (0~15) of each queue on a Gigabit Ethernet interface (or trunk group if trunking is enabled). The higher a queue's weight, the more service it gets. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

# 14.8 Switch Setup Isolation Screen

Click **Switch** > **Switch Setup** > **Isolation** to display the screen as shown.

**Figure 212** Switch Setup Isolation




The following table describes the labels in this screen.

**Table 169** Switch Setup Isolation

| LABEL | DESCRIPTION |
|---|---|
| Port Isolation Enable | Turn on port isolation to block communications between subscriber ports. When you enable port isolation you do not need to configure the VLAN to isolate subscribers. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |
| Add Isolation VLAN | The isolation VLAN fields display if you disable **Port Isolation**.<br>Use isolation VLANs to block communications between subscribers in different VLANs if you do not block communications between subscriber ports.<br>For example, you might want to isolate some VLAN (for example, high-speed Internet) and not isolate other VLAN (for example, VoIP). |
| VID | Specify the number of a VLAN for which you want to block communications with other VLANs. |
| Add | Click **Apply** to save your changes to the MSC1000G's volatile memory.<br>The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| Index | This field displays the index number of the isolated VLAN. |
| VLAN ID | This field displays the number of a VLAN for which communications with other VLAN are blocked. |

**Table 169** Switch Setup Isolation (continued)

| LABEL | DESCRIPTION |
|---|---|
| Select | Select an entry's **Select** check box and click **Delete** to remove the entry.<br>Clicking **Delete** saves your changes to the MSC1000G's volatile memory.<br>The MSC1000G loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to save your changes to the non-volatile memory when you are done configuring. |
| Select All | Select this check box to select all of the column's check boxes. Clear this check box to clear all of the column's check boxes. |

# 14.9 Spanning Tree Protocols

The switch supports Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP) and Multiple Spanning Tree Protocol (MSTP) as defined in the following standards.

- IEEE 802.1D Spanning Tree Protocol
- IEEE 802.1w Rapid Spanning Tree Protocol
- IEEE 802.1s Multiple Spanning Tree Protocol

## 14.9.1 STP and RSTP

RSTP adds rapid reconfiguration capability to STP. The switch supports RSTP and the earlier STP. RSTP and STP detect and break network loops and provide backup links between switches, bridges or routers. They allow a device to interact with other RSTP or STP-aware devices in your network to ensure that only one path exists between any two stations on the network. The switch uses RSTP by default but can still interoperate with STP switches (although without RSTP's benefits).

The root bridge is the base of the spanning tree; it is the bridge with the lowest identifier value (MAC address). Path cost is the cost of transmitting a frame onto a LAN through that port. It is assigned according to the speed of the link to which a port is attached. The slower the media, the higher the cost - see the following tables.

**Table 170** STP Path Costs

| LINK SPEED | RECOMMENDED VALUE | RECOMMENDED RANGE | ALLOWED RANGE |
|---|---|---|---|
| 4Mbps | 250 | 100 to 1000 | 1 to 65535 |
| 10Mbps | 100 | 50 to 600 | 1 to 65535 |
| 16Mbps | 62 | 40 to 400 | 1 to 65535 |
| 100Mbps | 19 | 10 to 60 | 1 to 65535 |
| 1Gbps | 4 | 3 to 10 | 1 to 65535 |
| 10Gbps | 2 | 1 to 5 | 1 to 65535 |

**Table 171** MSTP/RSTP Path Costs

| LINK SPEED | RECOMMENDED VALUE | RECOMMENDED RANGE | ALLOWED RANGE |
|---|---|---|---|
| <= 100 Kbps | 200 000 000 | 200 000 000 to 200 000 000 | 1 to 200 000 000 |
| 1 Mbps | 20 000 000 | 2 000 000 to 200 000 000 | 1 to 200 000 000 |

**Table 171** MSTP/RSTP Path Costs

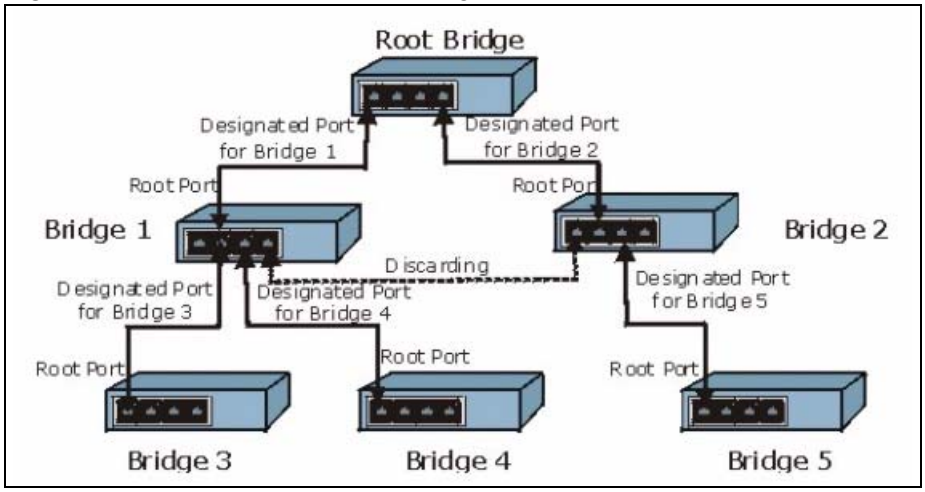
| LINK SPEED | RECOMMENDED VALUE | RECOMMENDED RANGE | ALLOWED RANGE |
|---|---|---|---|
| 10 Mbps | 2 000 000 | 200 000 to 20 000 000 | 1 to 200 000 000 |
| 100 Mbps | 200 000 | 20 000 to 2 000 000 | 1 to 200 000 000 |
| 1 Gbps | 20 000 | 2000 to 200 000 | 1 to 200 000 000 |
| 10 Gbps | 2000 | 200 to 20 000 | 1 to 200 000 000 |
| 100 Gbps | 200 | 20 to 2000 | 1 to 200 000 000 |
| 1000 Gbps | 20 | 2 to 200 | 1 to 200 000 000 |
| 10 000 Gbps | 2 | 1 to 20 | 1 to 200 000 000 |

On each bridge, the root port is the port through which this bridge communicates with the root. It is the port on this switch with the lowest path cost to the root (the root path cost). If there is no root port, then this switch has been accepted as the root bridge of the spanning tree network.

For each LAN segment, a designated bridge is selected. This bridge has the lowest cost to the root among the bridges connected to the LAN.

After a bridge determines the lowest cost-spanning tree with RSTP, it enables the root port and the ports that are the designated ports for the connected LANs, and disables all other ports that participate in RSTP. Network packets are therefore only forwarded between enabled ports, eliminating any possible network loops.

**Figure 213** STP Root Ports and Designated Ports




RSTP-aware devices exchange Bridge Protocol Data Units (BPDUs) periodically. When the bridged LAN topology changes, a new spanning tree is constructed.

In RSTP, the devices send BPDUs every Hello Time. If an RSTP-aware device does not get a Hello BPDU after three Hello Times pass (or the Max Age), the device assumes that the link to the neighboring bridge is down. This device then initiates negotiations with other devices to reconfigure the network to re-establish a valid network topology.

In STP, once a stable network topology has been established, all devices listen for Hello BPDUs transmitted from the root bridge. If an STP-aware device does not get a Hello BPDU after a predefined interval (Max Age), the device assumes that the link to the root bridge is down. This device then initiates negotiations with other devices to reconfigure the network to re-establish a valid network topology.

RSTP assigns three port states to eliminate packet looping while STP assigns five (see following table). A device port is not allowed to go directly from blocking state to forwarding state so as to eliminate transient loops.

**Table 172** RSTP and STP Port States

| RSTP PORT STATE | STP PORT STATE | DESCRIPTION |
|---|---|---|
| Discarding | Disabled | STP is disabled (default). |
| Discarding | Blocking | Only configuration and management BPDUs are received and processed. |
| Discarding | Listening | All BPDUs are received and processed. |
| Learning | Learning | All BPDUs are received and processed. Information frames are submitted to the learning process but not forwarded. |
| Forwarding | Forwarding | All BPDUs are received and processed. All information frames are received and forwarded. |

## 14.9.2 Multiple STP

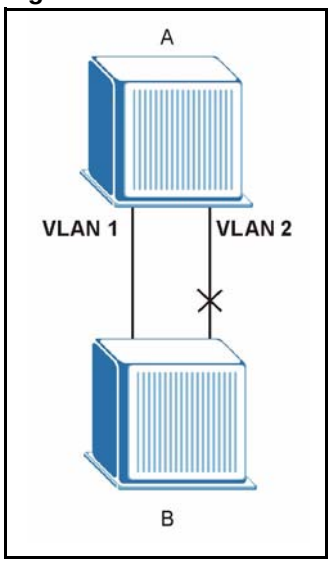
Multiple Spanning Tree Protocol (IEEE 802.1s) is backward compatible with STP/RSTP and addresses the limitations of existing spanning tree protocols (STP and RSTP) in networks to include the following features:

- One Common and Internal Spanning Tree (CIST) that represents the entire network's connectivity.
- Grouping of multiple bridges (or switching devices) into regions that appear as one single bridge on the network.
- Multiple Spanning Tree Instances (Mists) that allow multiple VLANs to use the same spanning tree.
- Load-balancing is possible as traffic from different VLANs can use distinct paths in a region.

### 14.9.2.1 MSTP Network Example

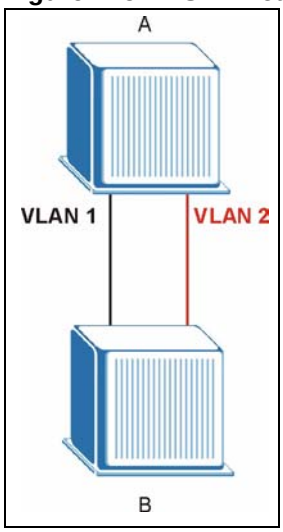
The following figure shows a network example where two VLANs are configured on the two switches. If the switches are using STP or RSTP, the link for VLAN 2 will be blocked as STP and RSTP allow only one link in the network and block the redundant link.

**Figure 214** STP/RSTP Network Example




With MSTP, VLANs 1 and 2 are mapped to different spanning trees in the network. Thus traffic from the two VLANs travel on different paths. The following figure shows the network example using MSTP.

**Figure 215** MSTP Network Example




### 14.9.2.2 MST Region

An MST region is a logical grouping of multiple network devices that appears as a single device to the rest of the network. Each MSTP-enabled device can only belong to one MST region. When BPDUs enter an MST region, external path cost (of paths outside this region) is increased by one. Internal path cost (of paths within this region) is increased by one when BPDUs traverse the region.

Devices that belong to the same MST region are configured to have the same MSTP configuration identification settings. These include the following parameters:

- Name of the MST region
- Revision level as the unique number for the MST region

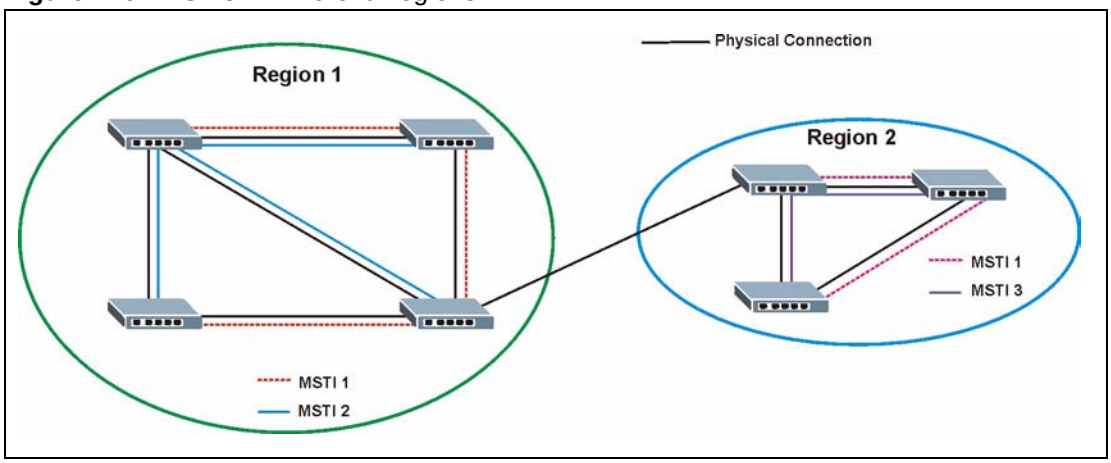
- VLAN-to-MST mapping

#### 14.9.2.3 MST Instance

An MST Instance (MSTI) is a set of VLANs that use the same spanning tree. Each created MSTI is identified by a unique number (known as an MST ID) known internally to a region. Thus an MSTI does not span across MST regions.

The following figure shows an example where there are two MST regions. Regions 1 and 2 have 2 spanning tree instances.

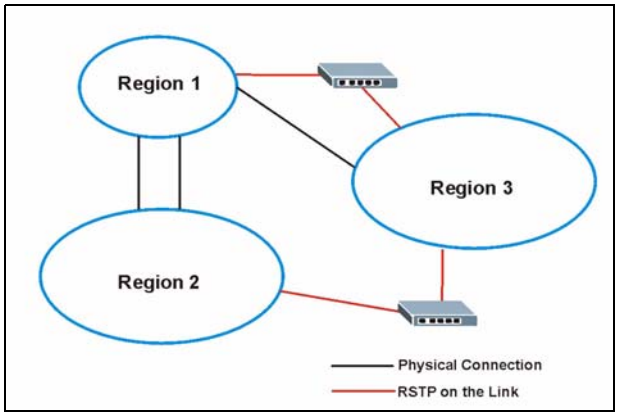
**Figure 216** MSTIs in Different Regions




#### 14.9.2.4 Common and Internal Spanning Tree (CIST)

A CIST represents the connectivity of the entire network and it is equivalent to a spanning tree in an STP/RSTP. The CIST is the default MST instance (MSTID 0). Any VLANs that are not members of an MST instance are members of the CIST. In an MSTP-enabled network, there is only one CIST that runs between MST regions and single spanning tree devices. A network may contain multiple MST regions and other network segments running RSTP.

**Figure 217** MSTP and Legacy RSTP Network Example



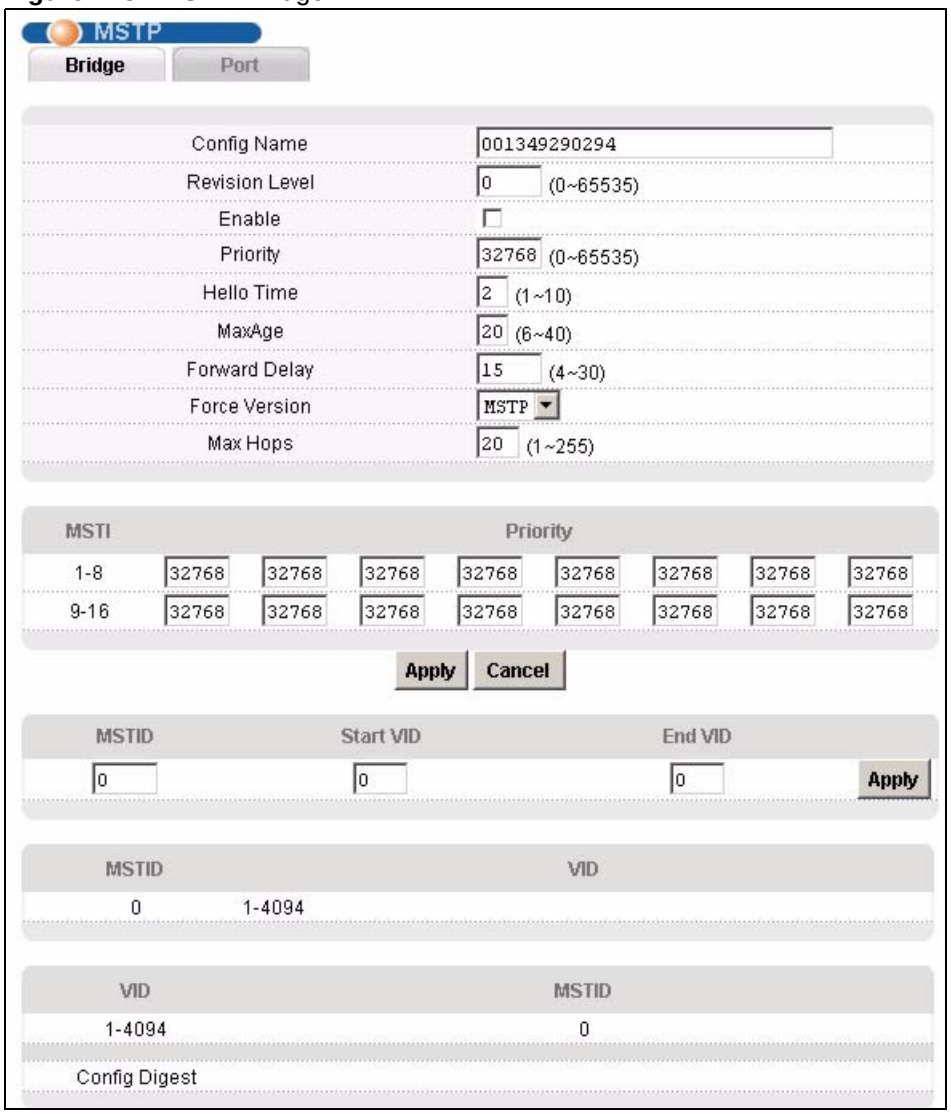
# 14.10 MSTP Setup

Use the MSTP screens to enable MSTP on the switch and configure MSTP bridge and port settings.

## 14.10.1 MSTP Bridge Settings

Click **Switch > MSTP** in the navigation panel to display the screen shown next. Use this screen to configure MSTP and RSTP settings.

**Figure 218** MSTP: Bridge




The following table describes the labels in this screen.

**Table 173** MSTP: Bridge

| LABEL | DESCRIPTION |
|---|---|
| Config Name | Enter a descriptive name (up to 31 characters) of an MST region. |
| Revision Level | Enter a number to identify a region's configuration. Devices must have the same revision level to belong to the same region. |

**Table 173** MSTP: Bridge (continued)

| LABEL | DESCRIPTION |
|---|---|
| Enable | Select this option to activate MSTP on the system. |
| Priority | Priority is used in determining the root switch. The switch with the highest priority (lowest numeric value) becomes the STP root switch. If all switches have the same priority, the switch with the lowest MAC address will then become the root switch. Enter a number between 0 and 65535. The system will automatically round the number to the nearest multiple of 4096.<br>The lower the numeric value you assign, the higher the priority for this switch.<br>Bridge Priority determines the root bridge, which in turn determines Hello Time, Max Age and Forwarding Delay. |
| Hello Time | This is the time interval in seconds between BPDU (Bridge Protocol Data Units) configuration message generations by the root switch. The allowed range is 1 to 10 seconds. |
| MaxAge | This is the maximum time (in seconds) a switch can wait without receiving a BPDU before attempting to reconfigure. All switch ports (except for designated ports) should receive BPDUs at regular intervals. Any port that ages out STP information (provided in the last BPDU) becomes the designated port for the attached LAN. If it is a root port, a new root port is selected from among the switch ports attached to the network. The allowed range is 6 to 40 seconds. |
| Forwarding Delay | This is the maximum time (in seconds) a switch will wait before changing states. This delay is required because every switch must receive information about topology changes before it starts to forward frames. In addition, each port needs time to listen for conflicting information that would make it return to a blocking state; otherwise, temporary data loops might result. The allowed range is 4 to 30 seconds. As a general rule:<br>2 * (Forward Delay - 1) >= Max Age >= 2 * (Hello Time + 1) |
| Force Version | Specify a spanning tree protocol (**MSTP** or **RSTP**) the switch is to use.<br>Select **MSTP** to configure multiple spanning trees that allows a loop-free network for one or more VLANs. Only MSTP BPDUs will be sent.<br>Select **RSTP** to send RSTP BPDUs and ignore any MSTP-specific information. |
| MaxHops | Enter the number of hops (between 1 and 255) in an MSTP region before the BPDU is discarded and the port information is aged. |
| MSTI | This field displays the MST instance number. The switch can identifies up to 16 spanning trees in a region. |
| Priority | Set the priority of the switch for the specific spanning tree instance. The lower the number, the more likely the switch will be chosen as the root bridge within the spanning tree instance.<br>Enter priority values between 0 and 61440 in increments of 4096 (thus valid values are 4096, 8192, 12288, 16384, 20480, 24576, 28672, 32768, 36864, 40960, 45056, 49152, 53248, 57344 and 61440). |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to start configuring this screen again. |
| MSTID | Enter the ID number (0 ~ 16) of a spanning tress to which you want to map the VLAN ID settings below. |
| Start VID | Enter the start of the VLAN ID range to map to the MST instance. |
| End VID | Enter the end of the VLAN ID range to map to the MST instance. To map only one VLAN, enter the same VID as the start VID. |
| Apply | Click **Apply** to add the VLAN-to-MST instance mapping. The new settings automatically displays in the tables below. |

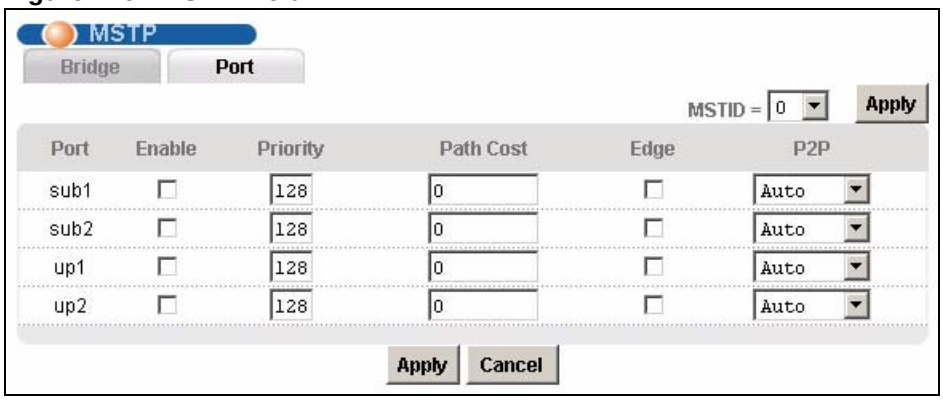
**Table 173** MSTP: Bridge (continued)

| LABEL | DESCRIPTION |
|---|---|
| MSTID | This field displays the ID of an MST instance. |
| VID | This field displays the VID (or VID ranges) to which the MST instance is mapped. |
| Config Digest | A configuration digest is generated from the VLAN-MSTI mapping information.<br>This field displays the 16-octet signature that is included in an MSTP BPDU. This field displays the digest when MSTP is activated on the system. |

## 14.10.2 MSTP Port Settings

Click **Switch** > **MSTP** > **Port** to display the configuration screen as shown. Use this screen to set the MST settings on the switch ports.

**Figure 219** MSTP: Port




The following table describes the labels in this screen.

**Table 174** MSTP: Port

| LABEL | DESCRIPTION |
|---|---|
| MSTID | Select an MST region ID from the drop-down list box and click **Apply** to set the port settings. |
| Port | This column lists the management switch card's Gigabit Ethernet interfaces. |
| Enable | Select this option to set the port to be a member of the selected MST region. |
| Priority | When a loop occurs and two ports have the same path cost, the port with a higher priority (lower numerical value) becomes the root port and the other port becomes an alternate port.<br>Specify the port priority in the spanning tree. Enter a number (between 1 and 255). Enter a smaller number to have the switch select this port first. If two ports have the same priority, the switch will select the one with the smallest port ID (which consists of the port priority and port number). |
| Path Cost | When a loop occurs, MSTP selects the port with the lowest path cost to the root bridge.<br>Specify the path cost (between 0 and 200000000) for the port. Enter a smaller number to have the switch select this port first. Enter 0 to have to system automatically determines the path cost based on the link speed. If two ports have the same path cost, the switch will select the one with the highest priority. |
| Edge | An edge port connects to a non-STP device.<br>Select this option to set the port as an edge port. The switch immediately sets this port to the forwarding state when a link failure is detected. This allows for fast recovery. |

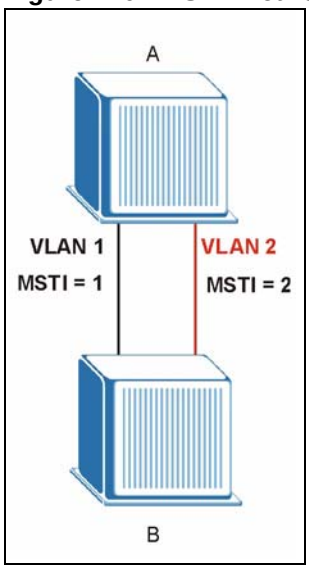
**Table 174** MSTP: Port (continued)

| LABEL | DESCRIPTION |
|---|---|
| P2P | Set a point-to-point link between ports to increase the speed of convergence by allowing the network to determine the designated port faster. The port must be connected directly to another switch port.<br>Select **Enable** to activate this feature on a full-duplex port that is connected directly to another switch port.<br>Select **Disable** to deactivate this feature on the port that is in half-duplex mode.<br>Select **Auto** to have the system automatically determine if the port is full-duplex or half-duplex. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to start configuring this screen again. |

## 14.10.3 MSTP Configuration Example

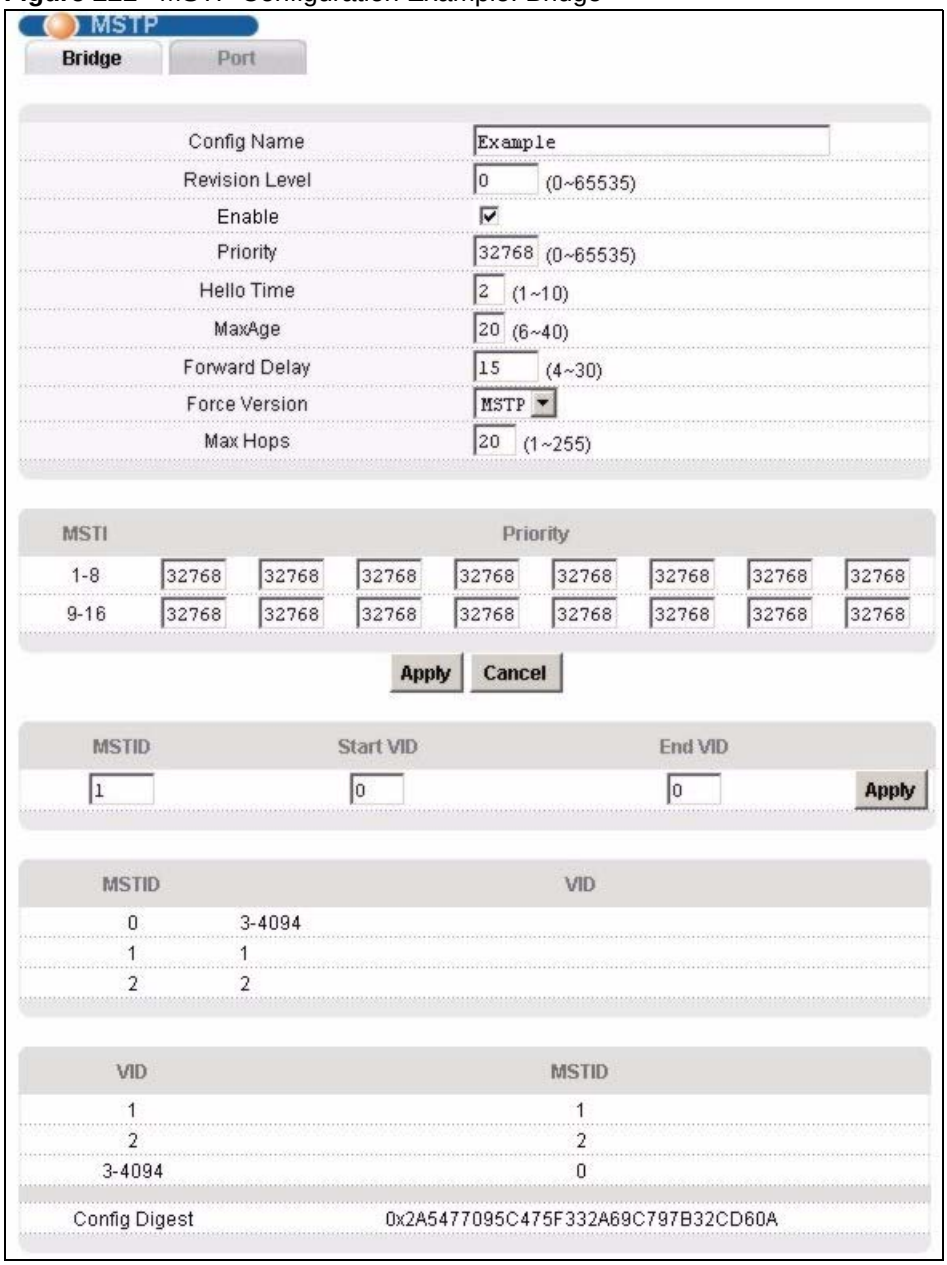
This section shows you how to configure MSTP settings for the network example shown. In this network example, there are two VLANs on two spanning tree instances.

**Figure 220** MSTP Network Example 2




1. Log into the web configurator and access the **MSTP-Bridge** screen.
2. Specify a descriptive name in the **Config Name** field for the MSTP region.
3. Enter a number in the **Revision Level** field.
4. To create VLAN-to-MSTI mapping, set the **MSTID**, **Start VID** and **End VID** fields and click **Apply**. For this example, map VLAN 1 to MSTID 1 and VLAN 2 to MSTID 2.

**Figure 221** MSTP Configuration Example: Bridge



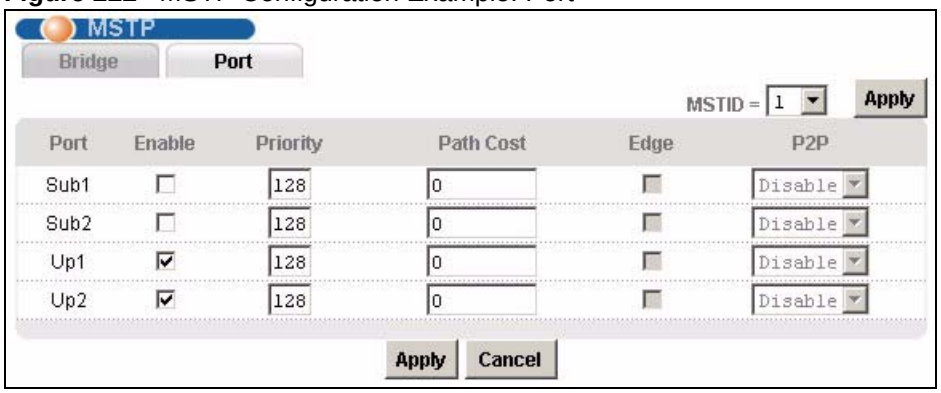

5 To configure port MSTP settings, click the **Port** tab.

6 Select the instance ID number in the **MSTID** field and click **Apply**.

7 Select **Enable** to set the port to belong to this spanning tree and click **Apply**.

For this network example, enable uplink ports 1 and 2 in the two spanning tree instances (MSTID 1 and 2).

**Figure 222** MSTP Configuration Example: Port




8 For switch B, configure the same general MSTP settings and VLAN-to-MST mappings as switch A for the subtending ports.

9 Set the subtending port priorities on switch B to allow MSTP to forward traffic to the corresponding link.

In MSTID1, set the subtending port 1 priority to 0 and subtending port 2 priority to 240.

In MSTID2, set the subtending port 1 priority to 240 and subtending port 2 priority to 0.

Devices belonging to the same MST region must have the same settings in the **Config Name** and **Revision Level** fields and VLAN-MST instance mapping(s).

## 14.11 Switch Port

This section describes the switch port features and parameters.

### 14.11.1 Uplink and Subtending Modes

The Gigabit Ethernet SFP slots and ports can function in either subtending or uplink mode. Connect a port in uplink mode to an backbone Ethernet switch or router. The management switch card allows traffic between the ports in uplink mode and the DSL ports on the line cards.

Use the subtending mode to daisy-chain other Ethernet switches. With subtending mode, the management switch card allows traffic between the ports in subtending mode and the ports in uplink mode. The management switch card does not allow traffic between the ports in subtending mode and the DSL ports on the line cards.

### 14.11.2 Flow Control

A concentration of traffic on a port decreases port bandwidth and overflows buffer memory causing packet discards and frame losses. Flow control is used to regulate transmission of signals to match the bandwidth of the receiving port.

The MSC1000G uses IEEE 802.3x flow control in full duplex mode and back pressure flow control in half duplex mode.

IEEE 802.3x flow control is used in full duplex mode to send a pause signal to the sending port, causing it to temporarily stop sending signals when the receiving port memory buffers fill.

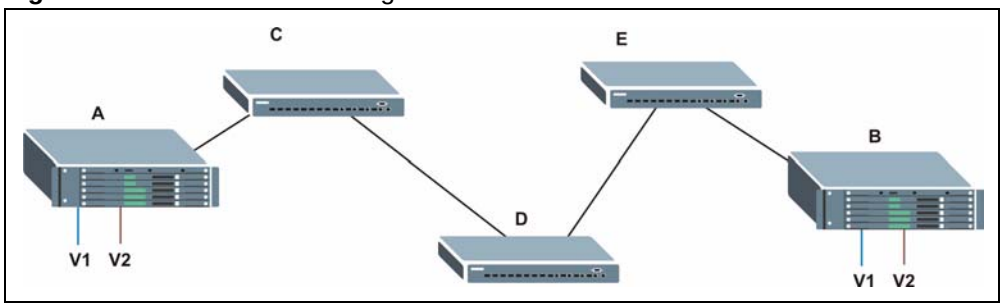
Back pressure flow control is typically used in half duplex mode to send a "collision" signal to the sending port (mimicking a state of packet collision) causing the sending port to temporarily stop sending signals and resend later.

## 14.11.3 Port VLAN Trunking

**VLAN Trunking** allows frames belonging to unknown VLAN groups to pass through a port. This is useful if you want to set up VLAN groups on end devices without having to configure the same VLAN groups on intermediary devices.

Refer to the following figure. Suppose you want to create VLAN groups 1 and 2 (V1 and V2) on devices A and B. Without **VLAN Trunking,** you must configure VLAN groups 1 and 2 on all intermediary switches C, D and E; otherwise they will drop frames with unknown VLAN group tags. However, with **VLAN Trunking** enabled on a port(s) in each intermediary switch you only need to create VLAN groups in the end devices (A and B). C, D and E automatically allow frames with VLAN group tags 1 and 2 (VLAN groups that are unknown to those switches) to pass through their VLAN trunking port(s).

**Figure 223** Port VLAN Trunking




## 14.11.4 Bandwidth Control

Use bandwidth control to define a maximum allowable bandwidth for incoming and/or out-going traffic flows on individual Gigabit Ethernet interfaces. This may be useful for limiting backbone bandwidth usage and preventing viruses from using up all of the system’s resources.

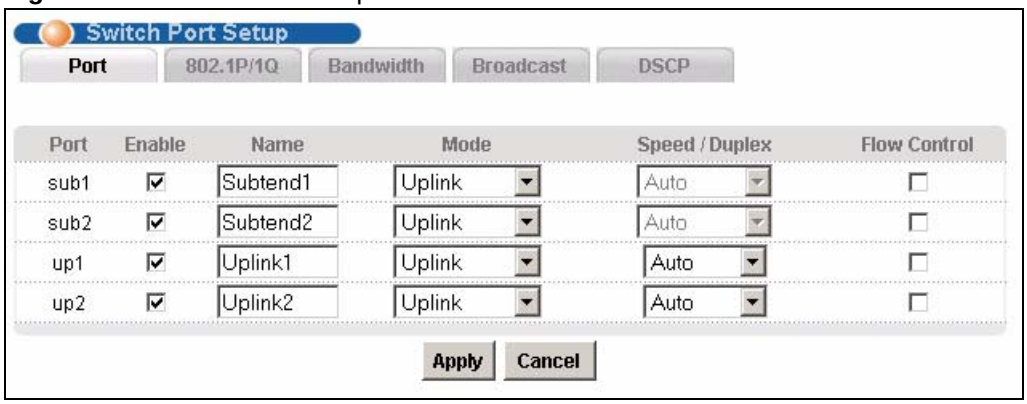
## 14.11.5 Broadcast Storm Control

Broadcast storm control limits the number of broadcast, multicast and destination lookup failure (DLF) packets the switch receives per second on the ports. When the maximum number of allowable broadcast, multicast and/or DLF packets is reached per second, the subsequent packets are discarded. Enable this feature to reduce broadcast, multicast and/or DLF packets in your network. You can specify limits for each packet type on each port. DLF packets are also known as unknown unicast packets.

# 14.12 Switch Port Setup Port Screen

Click **Switch** > **Switch Port Setup** in the navigation panel to display the screen shown next. Use this screen to configure basic settings for the Gigabit Ethernet interfaces.

**Figure 224** Switch Port Setup




The following table describes the labels in this screen.

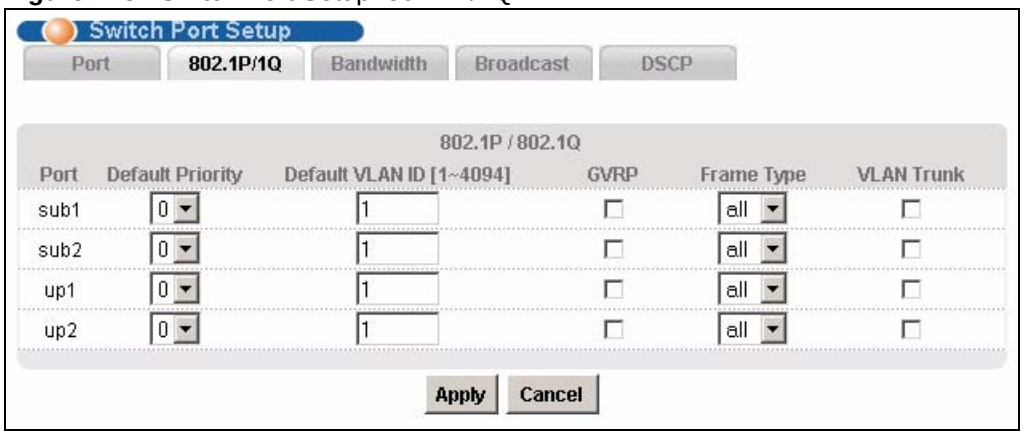
**Table 175** Switch Port Setup

| LABEL | DESCRIPTION |
|---|---|
| Port | This is the label of a Gigabit Ethernet interface. |
| Enable | Select this check box to turn on an interface. The factory default for all ports is enabled. A port must be enabled for data transmission to occur. |
| Name | Enter a descriptive name that identifies this port. You can use up to 31 English keyboard characters; spaces are not allowed. |
| Mode | Set a port as subtending to daisy-chain other Ethernet switches. Use uplink mode to connect to a backbone Ethernet switch or router. |
| Speed/Duplex | Select the type of Ethernet connection for this port. When you don't use auto-negotiation, you must make sure that the settings of the peer Ethernet port are the same in order to connect.<br>Select **Auto** (auto-negotiation) to have the system automatically determine the type of connection that the Ethernet port has. When the peer Ethernet device has auto-negotiation turned on, the system negotiates with the peer to determine the connection speed. If the peer Ethernet port does not have auto-negotiation turned on, the system determines the connection speed by detecting the signal on the cable and using full duplex.<br>Select **1000/Full** if the Ethernet port has a 1000 MB connection.<br>Select **100/Full** if the Ethernet port has a 100 MB full-duplex electrical connection.<br>Select **100/Half** if the Ethernet port has a 100 MB half-duplex electrical connection. |
| Flow Control | Select this check box to turn on flow control on a port. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

# 14.13 Switch Port Setup 802.1P/1Q Screen

Click **Switch** > **Switch Port Setup** > **802.1P/1Q** in the navigation panel to display the screen shown next. Use this screen to configure IEEE 802.1p priority and IEEE 802.1Q VLAN settings for the Gigabit Ethernet interfaces.

**Figure 225** Switch Port Setup: 802.1P/1Q




The following table describes the labels in this screen.

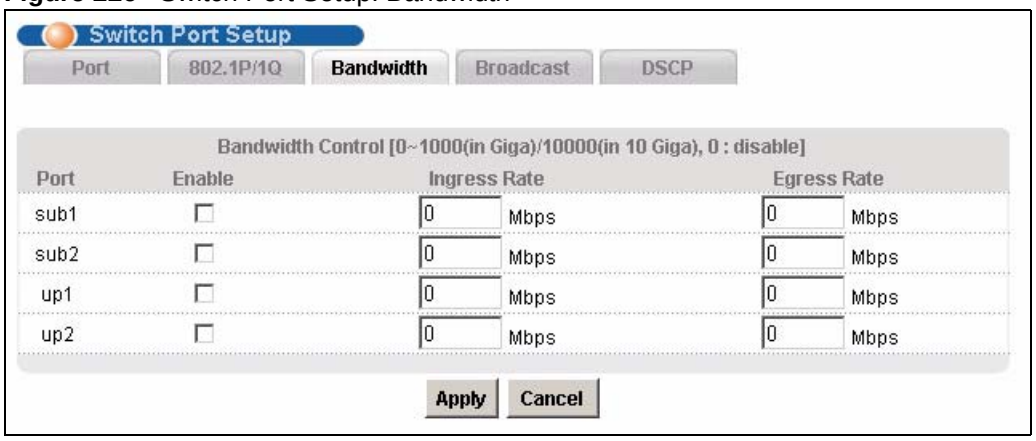
**Table 176** Switch Port Setup: 802.1P/1Q

| LABEL | DESCRIPTION |
|---|---|
| Port | This is the label of a Gigabit Ethernet interface. |
| Default Priority | Select a default priority to use for frames that come into the interface without a IEEE 802.1p priority tag. |
| Default VLAN ID [1-4094] | Select a default VLAN ID to use for frames that come into the interface without a IEEE 802.1Q VLAN ID. |
| GVRP | Select this check box to turn on GARP VLAN Registration Protocol to have the interface propagate VLAN information to other devices.<br>Clear the check box to not have the interface propagate VLAN information to other devices. |
| Frame Type | Select **all** to have the interface accept all Ethernet frames. Select **tag** to have the interface only accept frames with an IEEE 802.1Q VLAN tag. |
| VLAN Trunk | Select this check box to have the interface use VLAN trunking in order to accept frames with any VID.<br>Clear the check box to have the interface only accept frames with registered VIDs. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

# 14.14 Switch Port Setup Bandwidth Screen

Click **Switch** > **Switch Port Setup** > **Bandwidth** in the navigation panel to display the screen shown next. Use this screen to configure bandwidth control settings for the Gigabit Ethernet interfaces.

**Figure 226** Switch Port Setup: Bandwidth




The following table describes the labels in this screen.

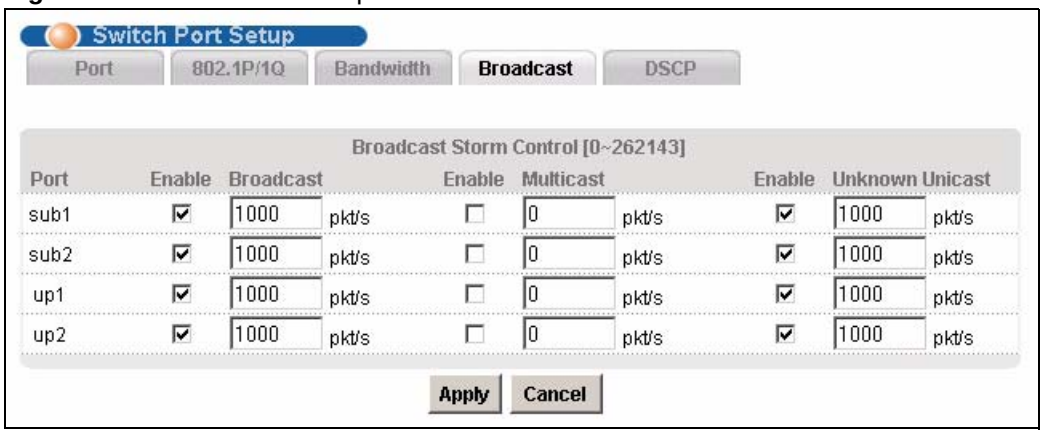
**Table 177** Switch Port Setup: Bandwidth

| LABEL | DESCRIPTION |
|---|---|
| Port | This is the label of a Gigabit Ethernet interface. |
| Enable | Select this check box to turn on bandwidth control for an interface. |
| Ingress Rate | Type a maximum bandwidth allowed for the incoming traffic flow on a port (measured in megabits per second). Use a number from 0 to 1000. |
| Egress Rate | Type a maximum bandwidth allowed for the out-going traffic flow on a port (measured in megabits per second). Use a number from 0 to 1000. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

## 14.15 Switch Port Setup Broadcast Screen

Click **Switch** > **Switch Port Setup** > **Broadcast** in the navigation panel to display the screen shown next. Use this screen to configure broadcast storm control settings for the Gigabit Ethernet interfaces.

**Figure 227** Switch Port Setup: Broadcast



The following table describes the labels in this screen.

**Table 178** Switch Port Setup: Broadcast

| LABEL | DESCRIPTION |
|---|---|
| Port | This is the label of a Gigabit Ethernet interface. |
| Broadcast | Select **Enable** to limit the number of broadcast packets the interface will accept per second.<br>Type how many broadcast packets the interface should accept per second (0~262143). |
| Multicast | Select **Enable** to limit the number of multicast packets the interface will accept per second.<br>Type how many multicast packets the interface should accept per second (0~262143). |
| Unknown Unicast | Select **Enable** to limit the number of unknown unicast packets the interface will accept per second. Unknown unicast packets are also known as destination lookup failure (DLF) packets.<br>Type how many unknown unicast packets the interface should accept per second (0~262143). |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

## 14.16 Switch Port Setup DSCP

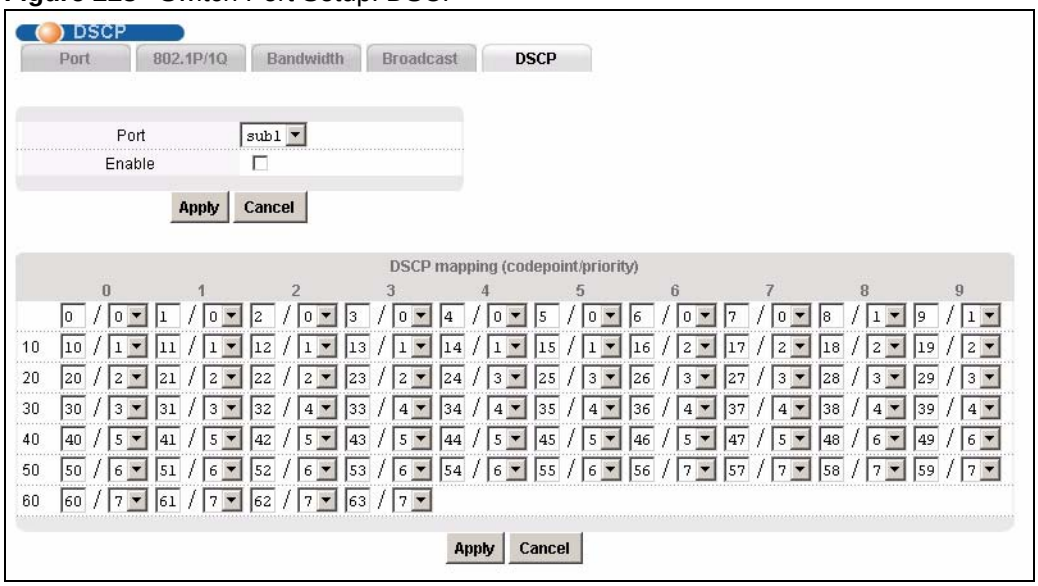
DSCP (Differentiated Services Code Point) is a field in the header of IP packets for packet classification purposes. The QoS (Quality-of-Service) in the Device uses DSCP to provide different level of services and priorities for downstream data transmission.

IEEE 802.1p lets the system transmit frames according to their 3-bit priority (0~7) in an IEEE 802.1q header. Frames with higher priority are served first. This system allows you to overwrite the DSCP level of service with an IEEE 802.1p priority for downstream traffic.

### 14.16.1 Switch Port Setup DSCP Screen

Click **Switch > Switch Port Setup > DSCP** in the navigation panel to display the screen shown next. Use this screen to map the DSCP code point of traffic received on the MSC's front panel Gigabit Ethernet interfaces to another DSCP code point. You can also configure the mapping between DSCP code points and IEEE 802.1p priorities for the Gigabit Ethernet interfaces. Use the **ACL > DSCP > Setup** screen shown to configure the mapping between DSCP code points and IEEE 802.1p priorities for subscribers (see Section 5.17.1 on page 124).

**Figure 228** Switch Port Setup: DSCP




The following table describes the labels in this screen.

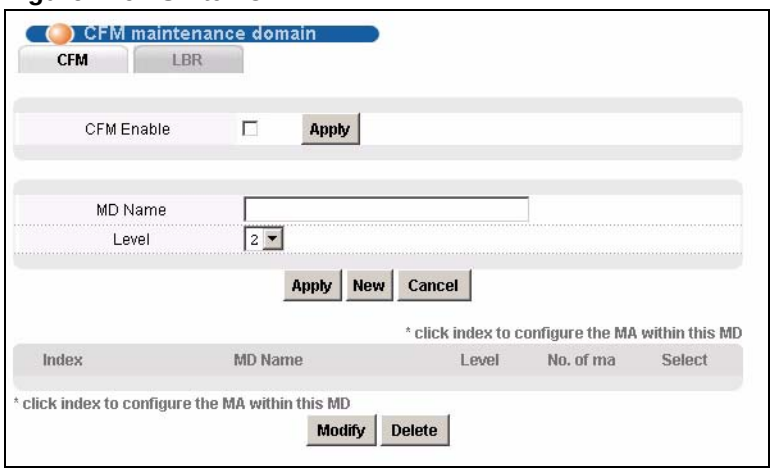
**Table 179** Switch Port Setup: DSCP

| LABEL | DESCRIPTION |
|---|---|
| Port | This is the label of a Gigabit Ethernet interface. |
| Enable | Select **Enable** to map DSCP (priorities) for individual ports. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |
| DSCP mapping (codepoint/ priority) | Use the fields to set a DSCP service level (codepoint) to which the system should change the DSCP service level.<br>Use the drop-down list boxes to select an IEEE 802.1p priority to which the Device should change the DSCP service level.<br>For example, to find the IEEE 802.1p priority level for DSCP service level 43, find 40 in the left hand column and 3 in the top row. The intersection of the 3 column and 40 row shows a priority setting of 5. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring the screen again. |

# 14.17 Switch CFM Screens

Click **Switch** > **CFM** in the navigation panel to display the screen shown next. Use this screen for initial configuration of a CFM (Connectivity Fault Management) domain, to globally switch this feature on or off and to create an MD. Refer to Section 8.1 on page 151 for more information.

**Figure 229** Switch CFM




The following table describes the labels in this screen.

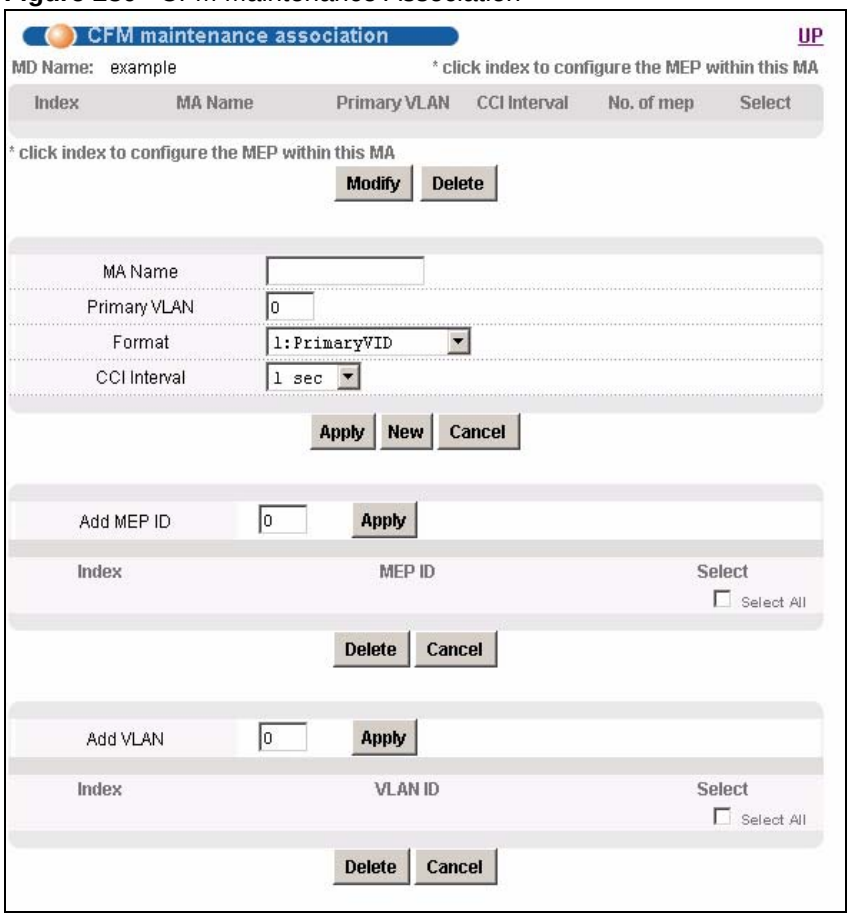
**Table 180** CFM Maintenance Domain

| LABEL | DESCRIPTION |
|---|---|
| CFM Enable | Select or deselect the check box and click **Apply** to turn the CFM feature on or off. |
| MD Name | Type a name (up to 31 printable ASCII characters) for this MD. This is for identification purposes. |
| Level | Type a level number (0~7) for this MD. |
| Apply | Click **Add** to add the settings as a new entry in the summary table below. |
| New | Click **New** to start configuring the MD setting again. |
| Cancel | Click **Cancel** to reset the fields. |
| Index | This field displays the index number for the record in this summary table. Click an index number to configure the associated MA under this MD. |
| MD Name | This field displays the descriptive name of the MD. |
| Level | This field displays the level number of the MD. |
| No. of ma | This field displays the number of the MAs under this MD. |
| Modify | Select an MD and click **Modify** to bring the MD information in this screen for modification. |
| Delete | Select an MD and click **Delete** to remove an MD. |

## 14.17.1 CFM MA Screen

Click an MD index number in the **Switch** > **CFM** screen to display the screen shown next. Use this screen to configure MAs, EP ID.

**Figure 230** CFM Maintenance Association




The following table describes the labels in this screen.

**Table 181** CFM Maintenance Association

| LABEL | DESCRIPTION |
|---|---|
| MD Name | This displays the MD name which you want to configure MAs, endpoint IDs, VLAN IDs in this screen. |
| Index | This field displays the index number of an MA. Click an index number to configure the associated endpoint under this MA. |
| MA Name | This field displays the descriptive name of the MA. |
| Primary VLAN | This field displays the primary VLAN ID of the MA. |
| CCI Interval | This field displays how often connectivity check messages are sent from an end point under this MA.<br>**4** = 1 second, **5** =10 seconds, **6** = 1 minute, **7** = 10 minutes. |
| No. of ep | This field displays the number of the end points under this MA. |
| Modify | Select an MA and click **Modify** to bring the MA information in this screen for modification. |
| Delete | Select an MA and click **Delete** to remove an MA. |
| MA Name | Type a name (up to 15 printable ASCII characters) for this MA. This is for identification purposes. |
| Primary VLAN | Type the primary VLAN ID (0~4094) for this MA. |

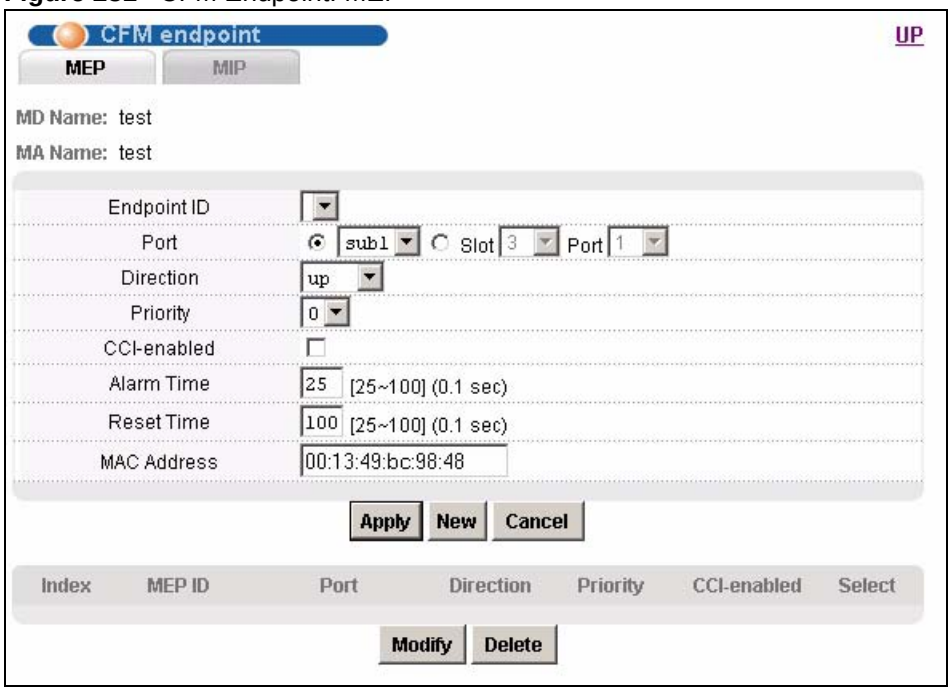
**Table 181** CFM Maintenance Association (continued)

| LABEL | DESCRIPTION |
|---|---|
| CCI Interval | Select a number to specify how often the device sends a CCI message.<br>**4**: 1 second<br>**5**: 10 seconds<br>**6**: 1 minute<br>**7**: 10 minutes |
| Apply | Click **Apply** to add the settings as a new entry in the summary table above. |
| New | Click **New** to start configuring an MA setting. |
| Cancel | Click **Cancel** to reset the fields. |
| Add MEP ID | Enter a remote MEP ID (1~8191) associated to this MA and allowed to be used in the CFM test. |
| Apply | Click **Apply** to add the settings as a new entry in the summary table below. |
| Index | This field displays the index number of a CFM endpoint. |
| MEPID | This field displays the descriptive name of the endpoint. |
| Delete | Select **Select All** or an individual endpoint and click **Delete** to remove endpoint(s). |
| Cancel | Click **Cancel** to reset the fields. |
| Add VLAN | Enter a VLAN ID (1~4094) associated to this MA. |
| Apply | Click **Apply** to add the settings as a new entry in the summary table below. |
| Index | This field displays the index number of a VLAN ID. |
| VLAN ID | This field displays the ID of a VLAN. |
| Delete | Select **Select All** or an individual endpoint and click **Delete** to remove endpoint(s). |
| Cancel | Click **Cancel** to reset the fields. |

## 14.17.2 CFM Endpoint Screen: MEP

Click an MA index number in the **Switch > CFM > CFM maintenance association** screen to display the screen shown next. Use this screen to configure Maintenance End Points (MEPs) under an MA.

**Figure 231** CFM Endpoint: MEP




The following table describes the labels in this screen.

**Table 182** CFM Endpoint: MEP

| LABEL | DESCRIPTION |
|---|---|
| MD Name | This displays the name of the MD for which you want to configure end points. |
| MA Name | This displays the name of the MA for which you want to configure end points. |
| Endpoint ID | Select a valid MEP ID which is defined in the **CFM maintenance association** screen. |
| Port | This binds the MEP ID to a physical port on the device. You can select an Ethernet port (**enet1** or **enet2**) or select a DSL port (by specifying a slot number and port number of a line card). |
| Direction | Select whether to send CCMs (Connectivity Check Messages) from the end point you selected in this screen (when you select **down**) or from (s) (when you select **up**). Select **up** only when the link of the specified end point is down. |
| Priority | Select the priority level for the CCMs configured in this screen. "0" is the lowest priority level and "7" is the highest. |
| CCI-enabled | Select this to enable CCMs sending from the end point configured in this screen. Deselect this to stop CCMs sending. |
| Alarm Time | This is the number of seconds the MSC1000G waits to send a local alarm after three CFM_ERROR events have been detected. |
| Reset Time | This is the number of seconds the MSC1000G waits to cancel a local alarm after a CFM_ERROR event has been resolved and no other alarms occurred. |
| MAC Address | Enter the CFM end point's MAC address. |
| Apply | Click **Apply** to add the settings as a new entry in the summary table above. |
| New | Click **New** to start configuring an MA setting. |
| Cancel | Click **Cancel** to reset the fields. |
| Index | This field displays the index number of an end point. |

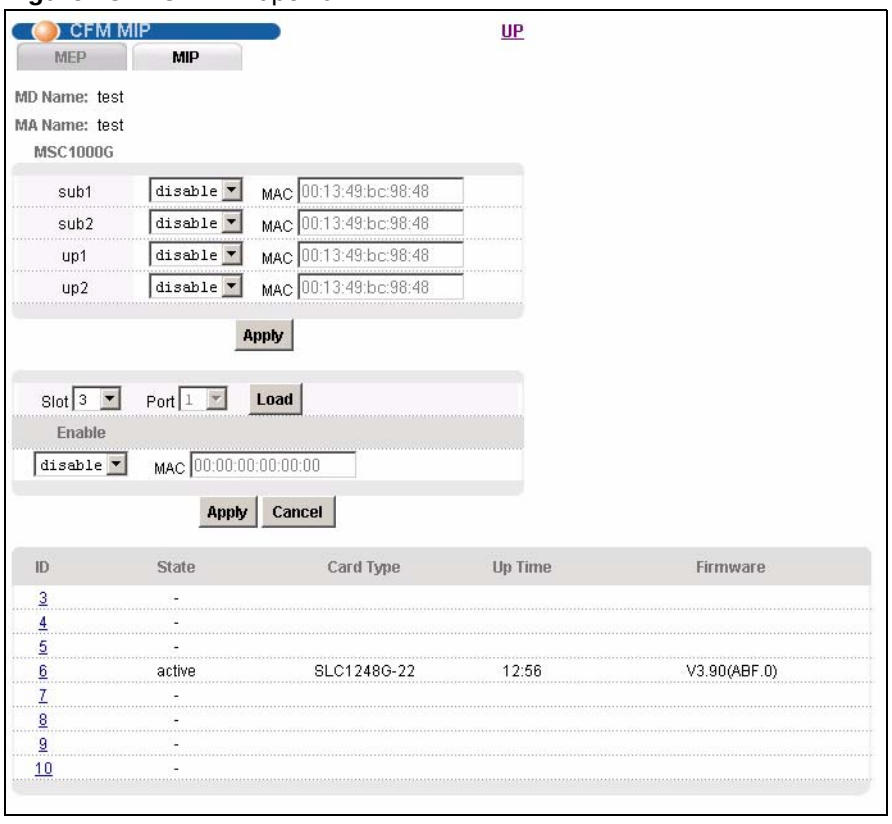
**Table 182** CFM Endpoint: MEP (continued)

| LABEL | DESCRIPTION |
|---|---|
| MEP ID | This field displays the MEP ID of the end point used when you need to do a CFM test or view the CFM statistics. |
| Port | This field displays the end point's physical port on the device. |
| Direction | This field displays whether to send CCMs (Connectivity Check Messages) from the end point you configured (**down**) or from (s) (**up**). |
| Priority | This field displays the priority of the end point. |
| CCI-enabled | This field displays the CCMs is sending for the configured end point or not. |
| Modify | Select an end point and click **Modify** to bring the end point's information shown in this screen for modification. |
| Delete | Select an end point and click **Delete** to remove it. |

## 14.17.3 CFM Endpoint Screen: MIP

Click an MA index number in the **Switch > CFM > CFM maintenance association** screen and then the **MIP** tab to display the screen shown next. Use this screen to configure Maintenance association Intermediate Points (MIPs) under an MA.

**Figure 232** CFM Endpoint: MIP



The following table describes the labels in this screen.

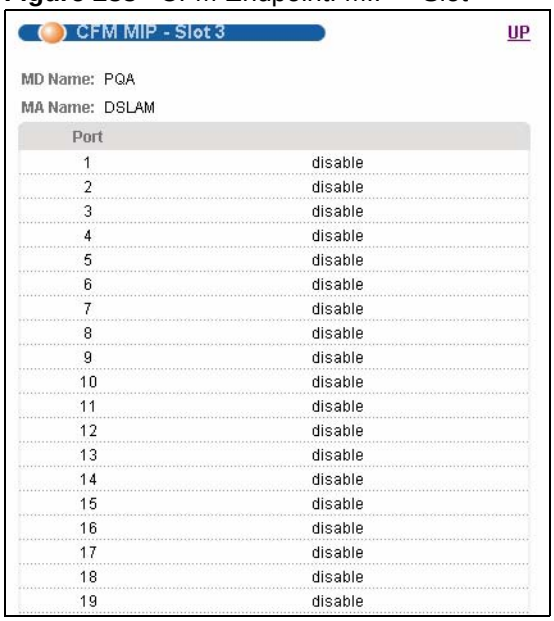
**Table 183** CFM Endpoint: MIP

| LABEL | DESCRIPTION |
|---|---|
| MD Name | This displays the name of the MD for which you want to configure end points. |
| MA Name | This displays the name of the MA for which you want to configure end points. |
| MSC1000G | Select **Enable** and specify a MAC address to set a MIP on an MSC port. |
| Apply | Click **Apply** to save the changes in this section to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Slot<br>Port | Use the drop-down list boxes to select a DSL port on a line card for which you want to configure MIP settings. |
| Load | Click **Load** to display the port's current settings. |
| Enable | Select **Enable** and specify a MAC address to set a MIP on a DSL port. |
| Apply | Click **Apply** to save the changes in this section to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to reset the fields. |
| ID | This is the slot number of a line card. Click the index number of an active line card to display a screen that lists the MIP setting for each of the line card's ports. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 14.17.4 CFM Endpoint: MIP Slot Screen

In the CFM Endpoint: MIP screen, click the ID of a line card to display the screen shown next. This screen lists the MIP setting for each of the line card's ports.

**Figure 233** CFM Endpoint: MIP > Slot




The following table describes the labels in this screen.

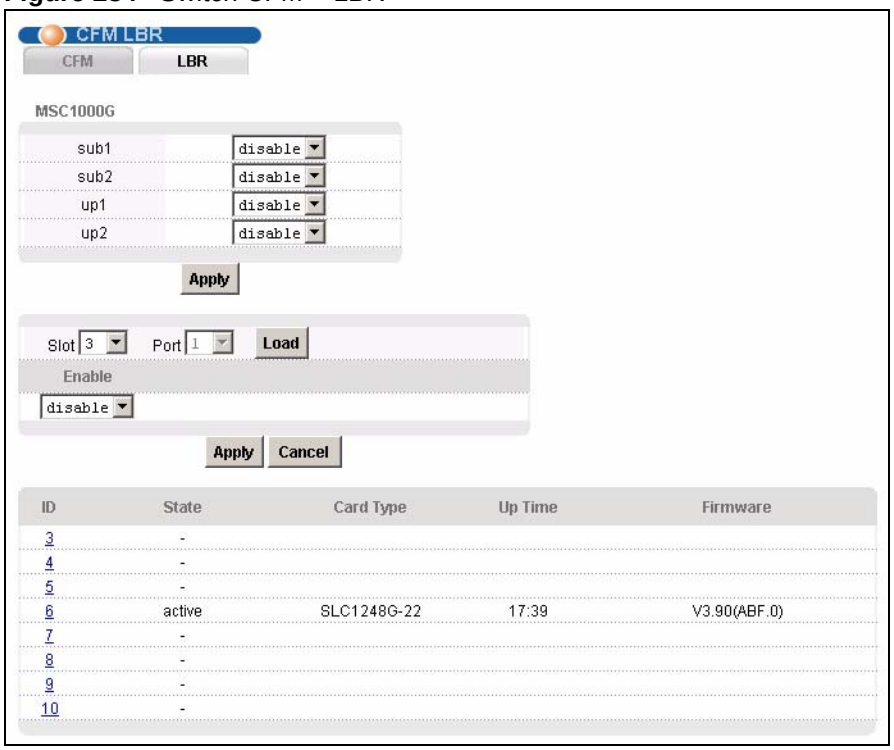
**Table 184** CFM Endpoint: MIP > Slot

| LABEL | DESCRIPTION |
|---|---|
| Port | This field displays the number of the DSL port. |
| Enable | This field displays whether or not the port is set to be a MIP. |

## 14.17.5 Switch CFM LBR Screen

Click **Switch** > **CFM** > **LBR** to display the screen shown next. Use this screen to enable or disable loopback testing on individual ports. LBR stands for Loop Back Response.

**Figure 234** Switch CFM > LBR




The following table describes the labels in this screen.

**Table 185** Switch CFM > LBR

| LABEL | DESCRIPTION |
|---|---|
| MSC1000G | Enable or disable loopback testing on the MSC's ports. |
| Apply | Click **Apply** to save the changes in this section to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Slot<br>Port | Use the drop-down list boxes to select a DSL port on a line card for which you want to enable or disable loopback testing. |
| Load | Click **Load** to display the port's current settings. |
| Enable | Enable or disable loopback testing on the DSL port. |
| Apply | Click **Apply** to save the changes in this section to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to reset the fields. |
| ID | This is the slot number of a line card. Click the index number of an active line card to display a screen that lists whether loopback testing is enabled or disabled for each of the line card's ports. |

**Table 185** Switch CFM > LBR (continued)

| LABEL | DESCRIPTION |
|---|---|
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 14.17.6 Switch CFM LBR Slot Screen

Click **Switch** > **CFM** > **LBR** and then the **ID** of a line card to display the screen shown next. This screen lists whether loopback testing is enabled or disabled for each of the line card's ports.

**Figure 235** Switch CFM > LBR > Slot

The following table describes the labels in this screen.

**Table 186** Switch CFM > LBR > Slot

| LABEL | DESCRIPTION |
|---|---|
| Port | This field displays the number of the DSL port. |
| Enable | This field displays whether loopback testing is enabled or disabled on the port. |

# 15

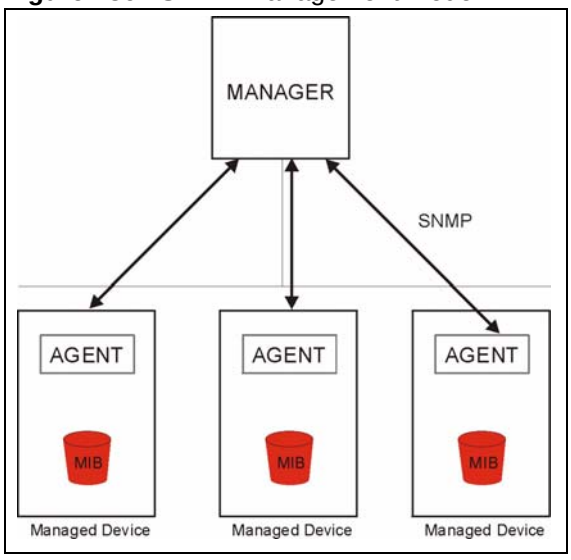
# Sys Screens

This chapter describes the Sys screens you use to configure general system, access control, syslog, administrator login accounts and management IP settings.

## 15.1 SNMP

Simple Network Management Protocol is a protocol used for exchanging management information between network switches. SNMP is a member of TCP/IP protocol suite. A manager station can manage and monitor the system through the network via SNMP version one (SNMPv1) and/or SNMP version 2c. The next figure illustrates an SNMP management operation. SNMP is only available if TCP/IP is configured.

**Figure 236** SNMP Management Model




An SNMP managed network consists of two main components: agents and a manager.

An agent is a management software module that resides in a managed switch (the system). An agent translates the local management information from the managed switch into a form compatible with SNMP. The manager is the console through which network administrators perform network management functions. It executes applications that control and monitor managed devices.

The managed devices contain object variables/managed objects that define each piece of information to be collected about a switch. Examples of variables include such as number of packets received, node port status etc. A Management Information Base (MIB) is a collection of managed objects. SNMP allows a manager and agents to communicate for the purpose of accessing these objects.

SNMP itself is a simple request/response protocol based on the manager/agent model. The manager issues a request and the agent returns responses using the following protocol operations:

**Table 187** SNMP Commands

| COMMAND | DESCRIPTION |
|---|---|
| Get | Allows the manager to retrieve an object variable from the agent. |
| GetNext | Allows the manager to retrieve the next object variable from a table or list within an agent. In SNMPv1, when a manager wants to retrieve all elements of a table from an agent, it initiates a Get operation, followed by a series of GetNext operations. |
| Set | Allows the manager to set values for object variables within an agent. |
| Trap | Used by the agent to inform the manager of some events. |

### 15.1.1 Supported MIBs

MIBs let administrators collect statistics and monitor status and performance. The system supports the following MIBs:

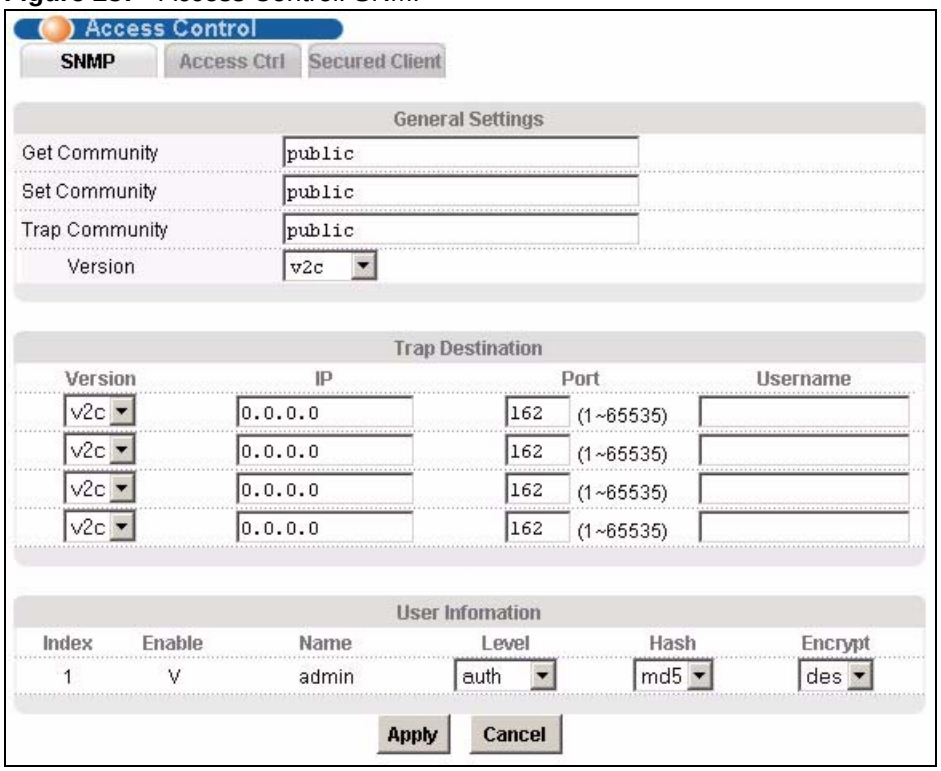
- SNMP MIB II (RFC 1213)
- BRIDGE MIB (RFC 1573) dot1dStp (RSTP), dot1dGarp (GARP)
- BRIDGE Extension MIB (RFC 2674)
- Dot3 MIB (RFC 2665)
- ADSL Line MIB (RFC 2662)
- ADSL Extension Line MIB (RFC 3440)
- RMON MIB (RFC 1757)
- ifXTable MIB (RFC 2863)
- RFC 3635
- RFC 3636

The system can also respond with specific data from the ZyXEL private ies5000 MIB.

## 15.2 SNMP Screen

Click **Sys > Access Control** from the navigation panel to open the following screen.

**Figure 237** Access Control: SNMP




The following table describes the labels in this screen.

**Table 188** Access Control: SNMP

| LABEL | DESCRIPTION |
|---|---|
| Get Community | Enter the get community, which is the password for the incoming Get- and GetNext- requests from the management station. You can use up to 31 English keyboard characters; spaces are not allowed. |
| Set Community | Enter the set community, which is the password for incoming Set- requests from the management station. You can use up to 31 English keyboard characters; spaces are not allowed. |
| Trap Community | Enter the trap community, which is the password sent with each trap to the SNMP manager. You can use up to 31 English keyboard characters; spaces are not allowed. |
| Version | Specify the SNMP version and access mode.<br>Select **v2c** to allow SNMPv2 read/write access.<br>Select **v3** to allow SNMPv3 read/write access with additional user authentication and data encryption options.<br>Select **v3v2c** to allow SNMPv3 read/write and SNMPv2 read-only access. |
| Trap Destination | Enter the IP address of a station to send your SNMP traps to. |
| Version | Specify the format of the SNMP trap PDU (Protocol Data Unit) to be sent. The default is **v2c**. |
| IP | Enter the IP address (in dotted decimal notation) of the trap server. |
| Port | Enter the port number upon which the station listens for SNMP traps. |
| Username | This field is applicable when you select **v3** in the **Version** field.<br>Enter the username to be included in the trap PDUs. |

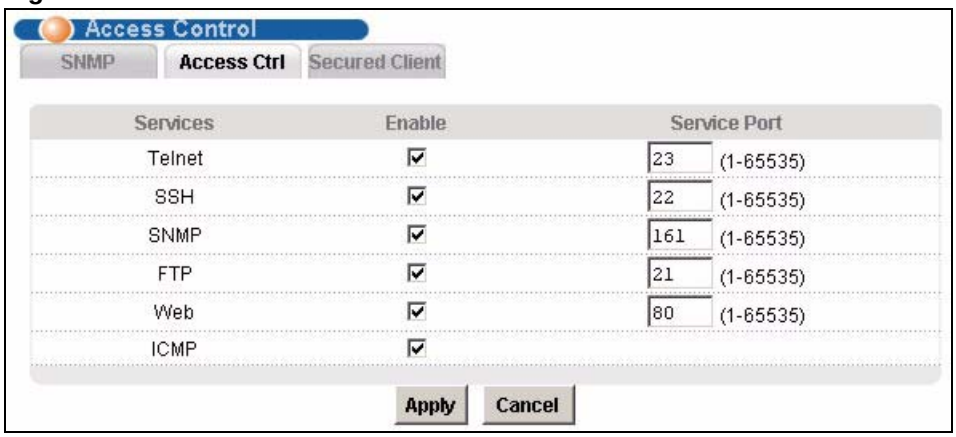
**Table 188** Access Control: SNMP (continued)

| LABEL | DESCRIPTION |
|---|---|
| User Information | Configure the administrative login accounts for SNMP management.<br>Use the **User Account** screen to create administrative login accounts. See Section 15.7 on page 387. |
| Index | This field displays the index number. |
| Enable | This field displays whether the administrative login account is activated or note. |
| Name | This field displays the administrative login account user name. |
| Level | Select **noauth** to disable SNMPv3 user authentication and encryption for SNMP communication.<br>Select **auth** to enable SNMPv3 user authentication.<br>Select **privacy** to enable SNMPv3 user authentication and encryption for SNMP communication using a private key generated from the password. |
| Hash | Specify an authentication method.<br>Select **md5** (Message Digest 5) to produce a 128-bit digest for minimal authentication security.<br>Select **sha** (Secure Hash Algorithm) to produces a 160-bit digest for maximum authentication security. |
| Encrypt | Specify an encryption method. Select **des** or **aes**.<br>Data Encryption Standard (DES) is a widely used method of data encryption using a secret key. DES applies a 56-bit key to each 64-bit block of data.<br>Advanced Encryption Standard (AES) is a newer method of data encryption that also uses a secret key. AES is more secure than DES. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

## 15.3 Service Access Control Screen

Click **Sys** > **Access Control** > **Access Ctrl** to open the following screen. Use this screen to set which services may be used to access the system.

**Figure 238** Access Control: Service Access Control



The following table describes the labels in this screen.

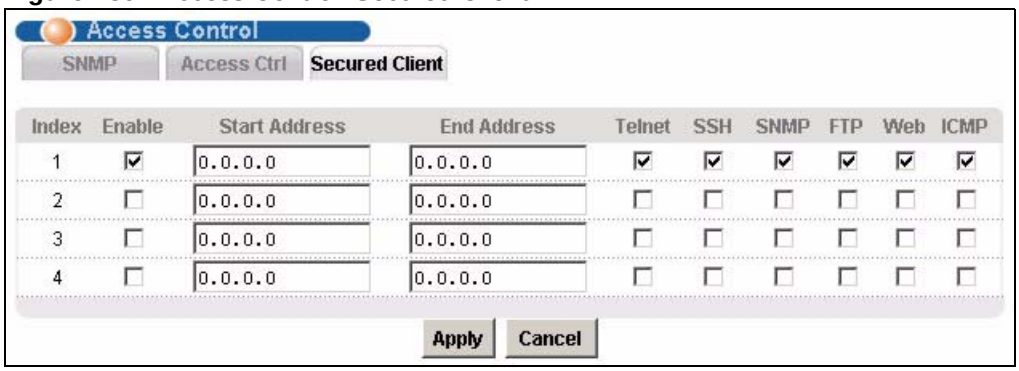
**Table 189** Access Control: Service Access Control

| LABEL | DESCRIPTION |
|---|---|
| Services | These are services you may use to access the system are listed here. |
| Enable | Select the **Enable** check boxes for the corresponding services that you want to allow to access the system. |
| Service Port | For Telnet, SSH, SNMP, FTP or web services, you can use this field to change the service port number. If you change the port number then you will have to let people (who wish to use the service) know the new port number for that service. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

## 15.3.1 Secured Client Screen

Click **Sys** > **Access Control** from the navigation panel and then the **Secured Client** tab to open the following screen. Use this screen to configure IP address ranges of trusted computers that may manage the system.

**Figure 239** Access Control: Secured Client




The following table describes the labels in this screen.

**Table 190** Access Control: Secured Client

| LABEL | DESCRIPTION |
|---|---|
| Index | This is the client set index number. A "client set" is a group of one or more "trusted computers" from which an administrator may use a service to manage the system. |
| Enable | Select this check box to activate this secured client set. Clear the check box if you wish to temporarily disable the set without deleting it. |
| Start Address<br>End Address | Configure the IP address range of trusted computers from which you can manage the system.<br>The system checks if the client IP address of a computer requesting a service or protocol matches the range set here. The system immediately disconnects the session if it does not match. |
| Telnet/SSH/ SNMP/FTP/Web/ ICMP | Select services that may be used for managing the system from the specified trusted computers. |

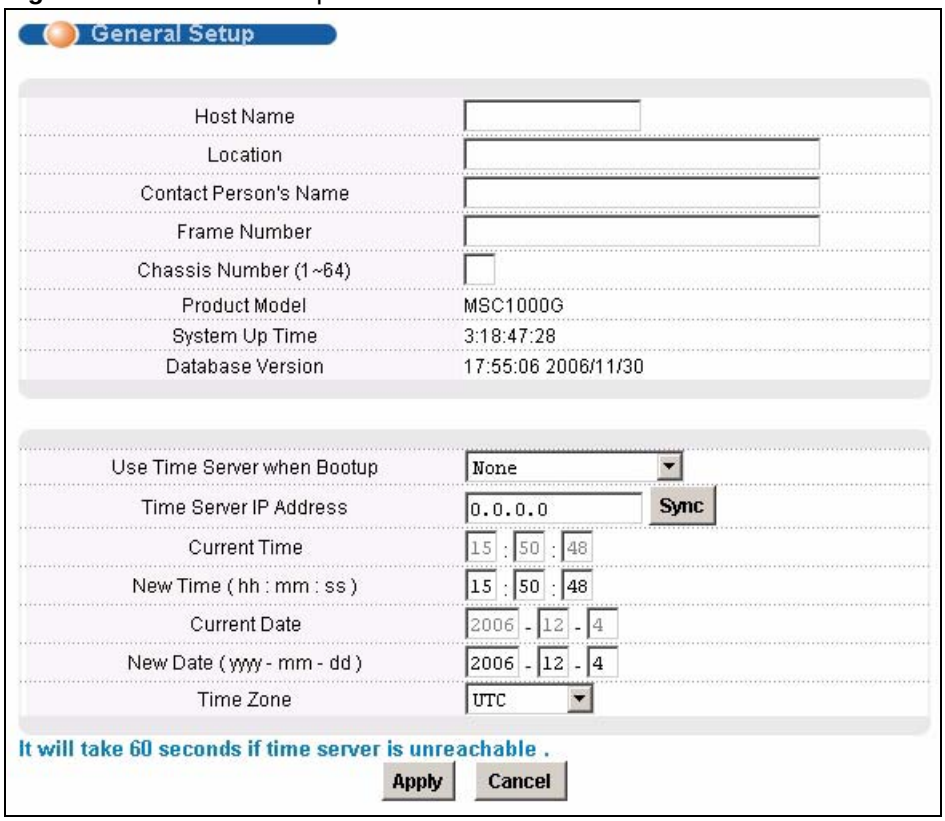
**Table 190** Access Control: Secured Client (continued)

| LABEL | DESCRIPTION |
|---|---|
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

## 15.4 General Setup

Click **Sys** > **General Setup** from the navigation panel to open the following screen.

**Figure 240** General Setup




The following table describes the labels in this screen.

**Table 191** General Setup

| LABEL | DESCRIPTION |
|---|---|
| Host Name | Choose a descriptive name for identification purposes. This name consists of up to 31 English keyboard characters; spaces are not allowed. |
| Location | Enter the geographic location of your system. You can use up to 31 English keyboard characters; spaces are not allowed. |
| Contact Person's Name | Enter the name of the person in charge of this system. You can use up to 31 English keyboard characters; spaces are not allowed. |
| Frame Number | Enter the number (an integer from 1 to 65535) of the frame (rack) where the system is installed. |

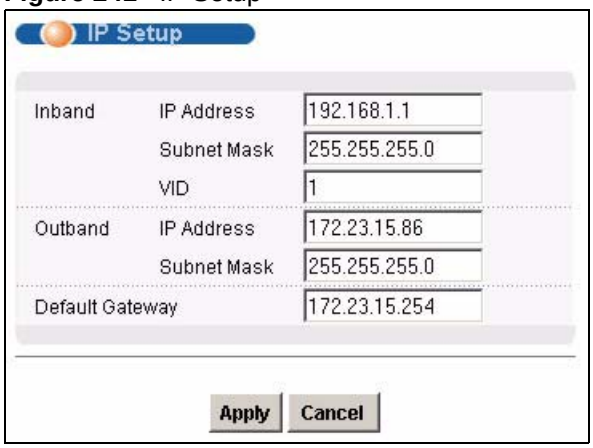
**Table 191** General Setup (continued)

| LABEL | DESCRIPTION |
|---|---|
| Chassis Number | Enter a chassis number (an integer from 1 to 64). The chassis number helps to keep track of this individual unit in a multiple unit application. |
| Product Model | This field displays your device type. |
| System Up Time | This field shows how long the system has been running since the last time it was started. |
| Database Version | This field displays the time and date that the system's configuration was last saved to the non-volatile memory. The time is in (24-hour) hour, minute and second format. The date is in year, month and day format. |
| Use Time Server When Bootup | Enter the time service protocol that a timeserver uses. Not all timeservers support all protocols, so you may have to use trial and error to find a protocol that works. The main differences between them are the time format.<br>When you select the **Daytime (RFC 867)** format, the system displays the day, month, year and time with no time zone adjustment. When you use this format it is recommended that you use a Daytime timeserver within your geographical time zone.<br>**Time (RFC-868)** format displays a 4-byte integer giving the total number of seconds since 1970/1/1 at 0:0:0.<br>**NTP (RFC-1305)** is similar to Time (RFC 868).<br>**None** is the default value. Enter the time manually. Each time you turn on the system, the time and date will be reset to 2000-1-1 0:0. |
| Time Server IP Address | Enter the IP address (or URL if you configure a domain name server in the IP Setup screen) of your timeserver. The system searches for the timeserver for up to 60 seconds. If you select a timeserver that is unreachable, then this screen will appear locked for 60 seconds. Please wait. |
| Current Time | This field displays the time you open this menu (or refresh the menu). |
| New Time (hh:min:ss) | Enter the new time in hour, minute and second format. The new time then appears in the **Current Time** field after you click **Apply**. |
| Current Date | This field displays the date you open this menu. |
| New Date (yyyy-mm-dd) | Enter the new date in year, month and day format. The new date then appears in the **Current Date** field after you click **Apply**. |
| Time Zone | Select the time difference between UTC (Universal Time Coordinated, formerly known as GMT, Greenwich Mean Time) and your time zone from the drop-down list box. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

## 15.5 IP Setup

Click **Sys > IP Setup** from the navigation panel to open the following screen. Use this screen to configure the system and management IP addresses and subnet masks.

**Figure 241** IP Setup




The following table describes the labels in this screen.

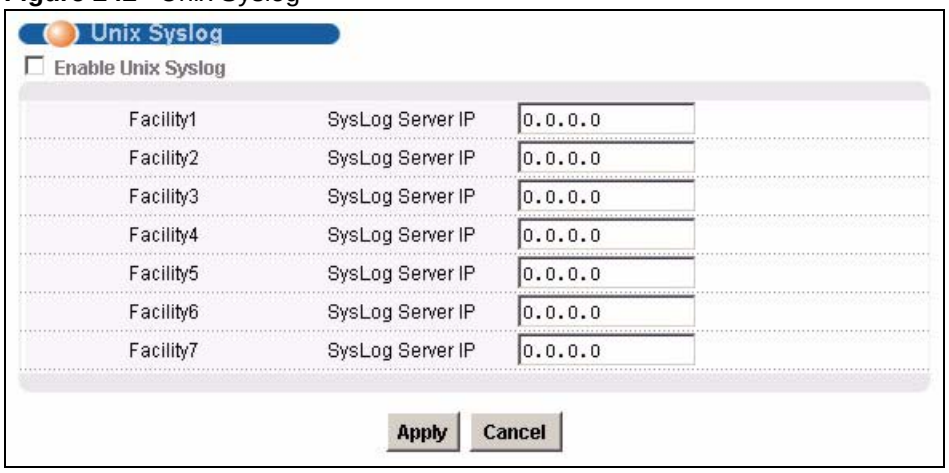
**Table 192** IP Setup

| LABEL | DESCRIPTION |
|---|---|
| Inband | These fields configure in-band management settings. In-band management refers to accessing the management interface through a network port (not the management port). |
| IP Address | Enter the in-band management IP address for the system in dotted decimal notation (for example 1.2.3.4). |
| IP Mask | Enter the in-band management IP subnet mask for the system in dotted decimal notation for example 255.255.255.0. |
| VID | Enter the VLAN ID (Identifier) of the management (CPU) VLAN. You must connect to the system through a port that is a member of the management (CPU) VLAN in order to perform in-band management. |
| Outband | These fields configure out-of-band management settings. Out-of-band management refers to accessing the management interface through a management port. |
| IP Address | Enter the out-of-band management IP address for the management port in dotted decimal notation (for example 1.2.3.4). |
| IP Mask | Enter the out-of-band management IP subnet mask for the management port in dotted decimal notation for example 255.255.255.0. |
| Default Gateway | Enter the IP address of the default outgoing gateway in dotted decimal notation. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

## 15.6 Syslog Screen

Click **Sys** > **Unix SysLog** from the navigation panel to open the following screen. The syslog feature sends logs to an external syslog server.

**Figure 242** Unix Syslog




The following table describes the labels in this screen.

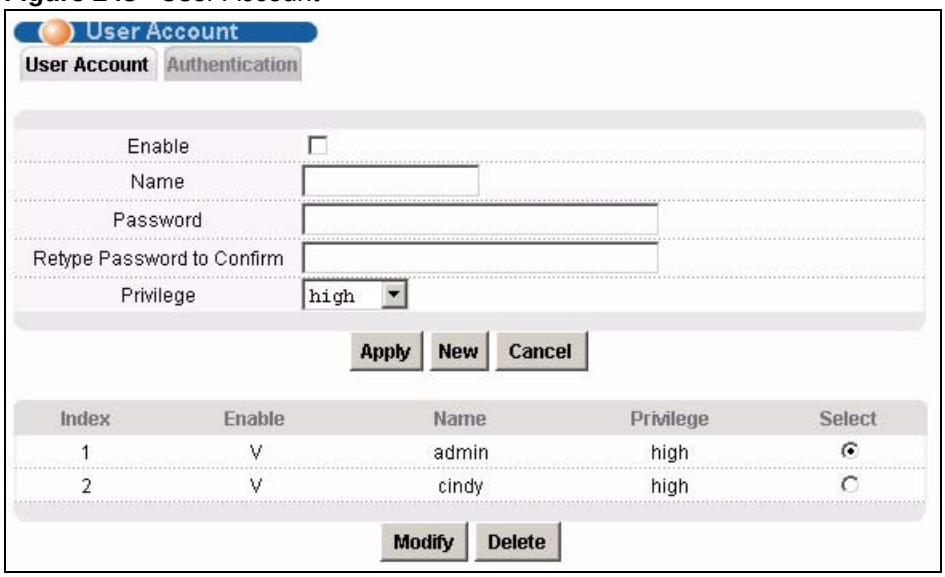
**Table 193** Unix Syslog

| LABEL | DESCRIPTION |
|---|---|
| Enable Unix Syslog | Select this check box to activate syslog (system logging) and then configure the syslog parameters described in the following fields. |
| Facility1~7 | The log facility allows you to send logs to different files in the syslog server. Please refer to the documentation of your syslog program for more details. |
| SysLog Server IP | Enter the IP address of the syslog server for the corresponding log facility. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

## 15.7 User Account Screen

Click **Sys** > **User Account** from the navigation panel to open the following screen. Use this screen to manage administrator accounts.

**Figure 243** User Account




The following table describes the labels in this screen.

**Table 194** User Account

| LABEL | DESCRIPTION |
|---|---|
| Enable | Select this check box to activate the administrator account. |
| Name | Type a user name for the account |
| Password | Type a password for the account. |
| Retype Password to confirm | Type the password again to make sure you have entered it properly. |
| Privilege | Select the administrator account's level of access privileges.<br>Select **high** to allow the administrator to perform all types of system configuration, including the management of administrator accounts.<br>Select **middle** to allow the administrator to configure the system through the web configurator but not manage administrator accounts.<br>Select **low** to allow the administrator read-only access to the web configurator screens. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |
| Index | This column numbers the administrator account entries. |
| Enable | This column displays a "V" if the administrator account is turned on or a "-" if the account is turned off. |
| Name | This column displays the user names of the accounts. |
| Privilege | This column displays the level of access privileges of the accounts. |
| Delete | Select one or more account entries' check boxes and then use the **Delete** button to remove it (or them). |

## 15.8 RADIUS Service Types

When you set the system to authenticate users using an external RADIUS server, the system assigns a privilege level to the login account based on the service type information received from the RADIUS server after the authentication is successful.

The following table shows the service type and privilege level mappings.

**Table 195** Service Type to Privilege Level Mapping

| SERVICE TYPE | PRIVILEGE LEVEL |
|---|---|
| login | low |
| nas-prompt | medium |
| admin | high |

## 15.9 TACACS+

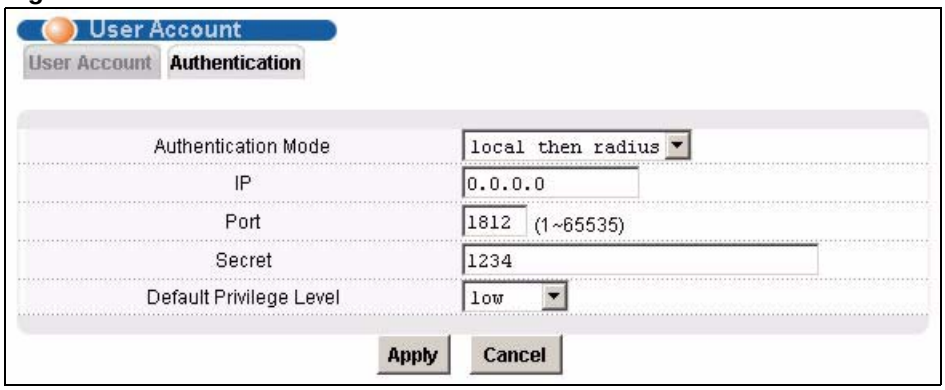
TACACS (Terminal Access Controller Access-Control System) is a security protocol similar to RADIUS. Like RADIUS, TACACS uses a centralized TACACS server that responds to client requests.

TACACS+ is the latest version of TACACS and supports authentication, authorization, and accounting (AAA). Earlier versions only supported authentication or authentication and accounting. TACACS+ connections are more reliable than those earlier TACACS versions due to the use of TCP as the transport protocol for packets. TACACS+ also encrypts the body of traffic traveling between the TACACS+ server and client (although the header is unencrypted).

## 15.10 User Account Authentication Screen

Click **Sys > User Account** from the navigation panel and then the **Authentication** tab to open the following screen. Use this screen to set up how the system authenticate administrators when they log in.

**Figure 244** User Account Authentication



The following table describes the labels in this screen.

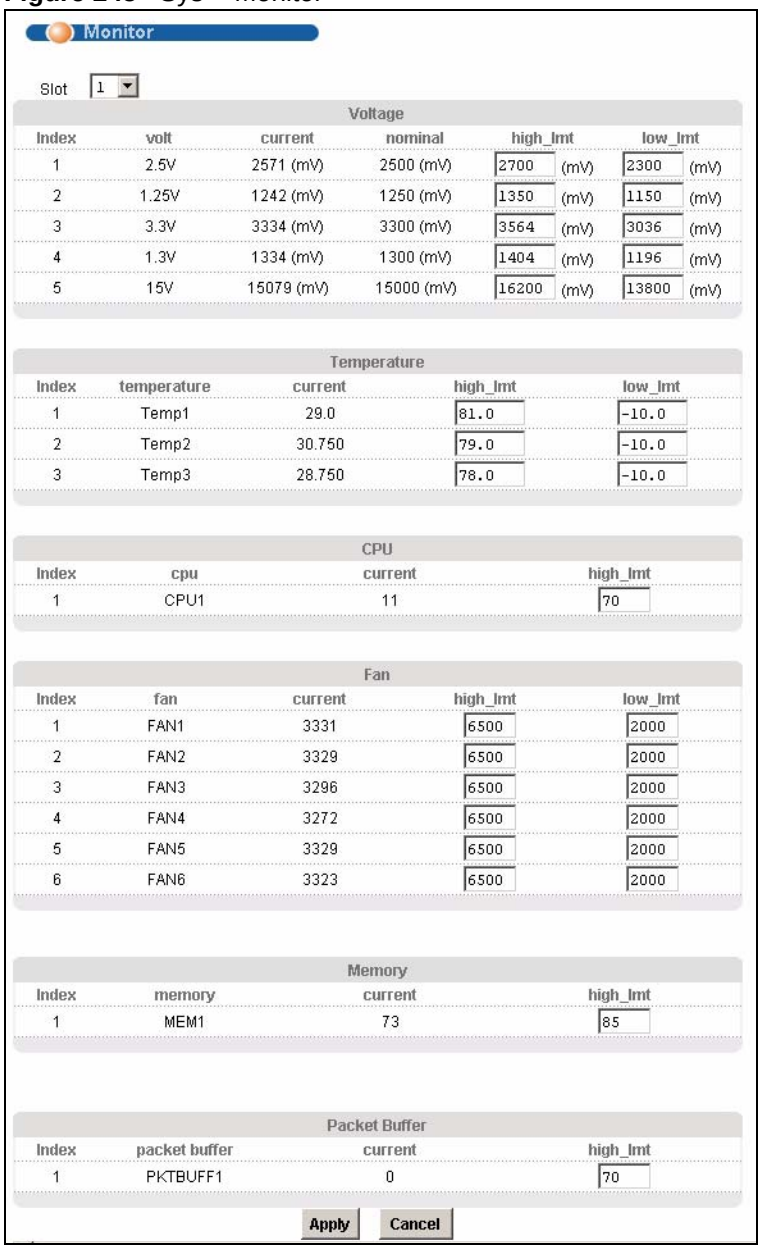
**Table 196** User Account Authentication

| LABEL | DESCRIPTION |
|---|---|
| Authentication Mode | Use this field to set which database the system uses to authenticate a user.<br>Select **local** to have the system use the internal user account database.<br>Select **radius** to have the system use an external RADIUS server.<br>Select **local first and then radius** to have the system check the internal user account database first, and then the external RADIUS server if there is no match.<br>Select **tacas+** to have the system use an external TACACS+ server.<br>Select **local first and then tacas+** to have the system check the internal user account database first, and then the external TACACS+ server if there is no match. |
| IP | Type the IP address of the RADIUS server. |
| Port | Type the RADIUS server's listening port number. The system uses the default of 1812 if you do not specify a port. |
| Secret | Type the password for the RADIUS server. |
| Default Privilege Level | Specify the default login account privilege level if no service type information is received from the RADIUS server.<br>Select a default privilege level (**low**, **medium** or **high**). Refer to Section 19.5 on page 442 for more information.<br>Select **deny** to block management access to the system.<br><br>Note: You will be blocked access to the system for remote management if you enter **deny** and the system uses only RADIUS authentication without receiving system type information. In this case, you can only access and manage the device through the console port. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

## 15.11 Monitor Screen

Click **Sys** > **Monitor** from the navigation panel to open the following screen. Use this screen to view hardware status information and set the hardware monitor high and low thresholds for generating alarms.

**Figure 245** Sys > Monitor


Monitor
Slot 1
Voltage
Index volt current nominal high_lmt low_lmt
1 2.5V 2571 (mV) 2500 (mV) 2700 (mV) 2300 (mV)
2 1.25V 1242 (mV) 1250 (mV) 1350 (mV) 1150 (mV)
3 3.3V 3334 (mV) 3300 (mV) 3564 (mV) 3036 (mV)
4 1.3V 1334 (mV) 1300 (mV) 1404 (mV) 1196 (mV)
5 15V 15079 (mV) 15000 (mV) 16200 (mV) 13800 (mV)
Temperature
Index temperature current high_lmt low_lmt
1 Temp1 29.0 81.0 -10.0
2 Temp2 30.750 79.0 -10.0
3 Temp3 28.750 78.0 -10.0
CPU
Index cpu current high_lmt
1 CPU1 11 70
Fan
Index fan current high_lmt low_lmt
1 FAN1 3331 6500 2000
2 FAN2 3329 6500 2000
3 FAN3 3296 6500 2000
4 FAN4 3272 6500 2000
5 FAN5 3329 6500 2000
6 FAN6 3323 6500 2000
Memory
Index memory current high_lmt
1 MEM1 73 85
Packet Buffer
Index packet buffer current high_lmt
1 PKTBUFF1 0 70
Apply
Cancel

The following table describes the labels in this screen.

**Table 197** Sys > Monitor

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the number of a card's slot. |
| Voltage(V) | The power supply for each voltage has a sensor that can detect and report the voltage. |
| Index | This field displays the number of the power supply in the list. |
| volt | This field displays the voltage that the power supply provides. Measured in volts (V). |
| current | This field displays the current voltage reading. Measured in millivolts (mV). |
| nominal | This field displays the normal (expected) voltage in millivolts (mV). |

**Table 197** Sys > Monitor (continued)

| LABEL | DESCRIPTION |
|---|---|
| high_lmt | Use these fields to set the maximum voltage threshold for each sensor.<br>The maximum voltage for each voltage sensor must be within the following ranges. Measured in millivolts (mV).<br>MSC1000G: 1 = 2575~2750, 2 = 1287~1375, 3 = 3399~3630, 4 = 1339~1430, 5 = 15450~16500<br>ADSL line card: 1 = 1236~1320, 2 = 1854~1980, 3 = 3399~3630, 4 = 21115~22550<br>SHDSL line card 1 = 1854~1980, 2 = 3399~3630, 3 = 15450~16500<br>VDSL line card 1 = 3399~3630, 2 = 12360~13200, 3 = 1236~1320, 4 = 1236~1320, 5 = 1854~1980<br>VoIP line card 1 = 1339~1430, 2 = 2575~2750, 3 = 3399~3630, 4 = 3399~3630, 5 = 5150~5500<br>Ethernet line card 1 = 2575~2750, 2 = 1287~1375, 3 = 3399~3630, 4 = 5150~5500 |
| low_limit | Use these fields to set the minimum voltage threshold for each sensor.<br>The minimum voltage for each voltage sensor must be within the following ranges. Measured in millivolts (mV).<br>MSC1000G:1= 2250~2425, 2 = 1125~1212, 3 = 2970~3201, 4 = 1170~1261, 5 = 13500~14550.<br>ADSL line card: 1= 1080~1164, 2 = 1620~1746, 3 = 2970~3201, 4 = 18450~19885<br>SHDSL line card: 1 = 1620~1746, 2 = 2970~3201, 3 = 13500~14550<br>VDSL line card 1 = 2970~3201, 2 = 10800~11640, 3 = 1080~1164, 4 = 1080~1164, 5 = 1620~1746<br>VoIP line card 1 = 1170~1261, 2 = 2750~2425 3 = 2970~3201, 4 = 2970~3201, 5 = 4500~4850<br>Ethernet line card 1 = 2250~2425, 2 = 1080~1164, 3 = 970~3201, 4 = 4500~4850 |
| Temperature | Each temperature sensor can detect and report the temperature. |
| Index | This field displays the number of the temperature sensor in the list. |
| temperature | This field displays the name of the temperature sensor. |
| current | This field displays the current temperature at this sensor (in degrees Celsius). |
| high_lmt | Use these fields to set the maximum temperature threshold for each sensor.<br>The maximum temperature for each temperature sensor must be within 50~100 (degrees Celsius). |
| low_limit | Use these fields to set the minimum temperature threshold for each sensor.<br>The minimum temperature for each temperature sensor must be within -50~10 ((degrees Celsius). |
| CPU | The system can detect and report the utilization of each card's CPU. |
| Index | This field displays the number of the CPU in the list. |
| cpu | This field displays the name of the CPU. |
| current | This field displays the current percentage of CPU utilization. |
| high_lmt | Use this field to set the maximum utilization threshold for the CPU. |
| Fan | These fields display when you select the MSC. A properly functioning fan is an essential component (along with a sufficiently ventilated, cool operating environment) in order for the device to stay within the temperature threshold. Each fan has a sensor that can detect and report the fan's RPM (Rotations Per Minute). |
| Index | This field displays the number of the fan in the list. |
| fan | This field displays the name of the fan. |

**Table 197** Sys > Monitor (continued)

| LABEL | DESCRIPTION |
|---|---|
| current | This is the fan's current RPM reading. |
| high_lmt | Use these fields to set the maximum RPM threshold for each sensor.<br>The maximum RPM for each fan must be within 1000~8000. |
| low_limit | Use these fields to set the minimum RPM threshold for each sensor.<br>The minimum RPM for each fan must be within 1000~8000. |
| Memory | These fields display when you select the MSC. Use these fields to monitor the system's memory usage. |
| Index | This field displays the number of the memory in the list. |
| memory | This field displays the name of the memory. |
| current | This field displays the current percentage of memory utilization. |
| high_lmt | Use this field to set the maximum utilization threshold for the memory. |
| Packet Buffer | These fields display when you select the MSC. Use these fields to monitor the system's packet buffer usage. |
| Index | This field displays the number of the packet buffer in the list. |
| packet buffer | This field displays the name of the packet buffer. |
| current | This field displays the current percentage of packet buffer utilization. |
| high_lmt | Use this field to set the maximum utilization threshold for the packet buffer. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to begin configuring this screen afresh. |

# 16

# VLAN Screens

## 16.1 VLAN Introduction

A VLAN (Virtual Local Area Network) allows a physical network to be partitioned into multiple logical networks. Devices on a logical network belong to one group. A device can belong to more than one group. With VLAN, a device cannot directly talk to or hear from devices that are not in the same group(s); the traffic must first go through a router.

In MTU (Multi-Tenant Unit) applications, VLAN is vital in providing isolation and security among the subscribers. When properly configured, VLAN prevents one subscriber from accessing the network resources of another on the same LAN, thus a user will not see the printers and hard disks of another user in the same building. If you have enabled port isolation in the **Switch Setup** screen, you do not need to configure the VLAN to isolate subscribers.

VLAN also increases network performance by limiting broadcasts to a smaller and more manageable logical broadcast domain. In traditional switched environments, all broadcast packets go to each and every individual port. With VLAN, all broadcasts are confined to a specific broadcast domain.

## 16.2 IEEE 802.1Q Tagged VLAN

The IEEE 802.1Q Tagged VLAN uses both explicit and implicit tagging.

1. Explicit Tagging
   A VLAN identifier is added to the frame header that identifies the source VLAN.
2. Implicit Tagging
   The MAC (Media Access Control) number, the port or other information is used to identify the source of a VLAN frame.

Tagged VLAN uses an explicit tag (VLAN ID) in the MAC header to identify the VLAN membership of a frame across bridges - they are not confined to the switch on which they were created. The VLANs can be created statically by hand or dynamically through GVRP. The VLAN ID associates a frame with a specific VLAN and provides the information that switches need to process the frame across the network. A tagged frame is four bytes longer than an untagged frame and contains two bytes of TPID (Tag Protocol Identifier, residing within the type/length field of the Ethernet frame) and two bytes of TCI (Tag Control Information, starts after the source address field of the Ethernet frame).

The CFI (Canonical Format Indicator) is a single-bit flag, always set to zero for Ethernet switches. If a frame received at an Ethernet port has a CFI set to 1, then that frame should not be forwarded as it is to an untagged port. The remaining twelve bits define the VLAN ID, giving a possible maximum number of 4,096 VLANs. Note that user priority and VLAN ID

are independent of each other. A frame with VID (VLAN Identifier) of null (0) is called a priority frame, meaning that only the priority level is significant and the default VID of the ingress port is given as the VID of the frame. Of the 4096 possible VIDs, a VID of 0 is used to identify priority frames and value 4095 (FFF) is reserved, so the maximum possible VLAN configurations are 4,094.

| TPID | User Priority | CFI | VLAN ID |
|---|---|---|---|
| 2 Bytes | 3 Bits | 1 Bit | 12 bits |

The system handles up to 4094 VLANs (VIDs 1-4094). The switch accepts incoming frames with VIDs 1-4094.

### 16.2.1 Forwarding Tagged and Untagged Frames

Each port on the switch is capable of passing tagged or untagged frames. To forward a frame from an 802.1Q VLAN-aware switch to an 802.1Q VLAN-unaware switch, the switch first decides where to forward the frame and then strips off the VLAN tag. To forward a frame from an 802.1Q VLAN-unaware switch to an 802.1Q VLAN-aware switch, the switch first decides where to forward the frame, and then inserts a VLAN tag reflecting the ingress port's default VID. The default PVID is VLAN 1 for all ports, but this can be changed.

The egress (outgoing) port(s) of a frame is determined on the combination of the destination MAC address and the VID of the frame. For a unicast frame, the egress port based by the destination address must be a member of the VID, also; otherwise, the frame is blocked. A broadcast frame (or a multicast frame for a multicast group that is known by the system) is duplicated only on ports that are members of the VID (except the ingress port itself), thus confining the broadcast to a specific domain.

Whether to tag an outgoing frame depends on the setting of the egress port on an individual VLAN and port basis (remember that a port can belong to multiple VLANs). If the tagging on the egress port is enabled for the VID of a frame, then the frame is transmitted as a tagged frame; otherwise, it is transmitted as an untagged frame.

## 16.3 Automatic VLAN Registration

GARP and GVRP are the protocols used to automatically register VLAN membership across switches.

### 16.3.1 GARP

GARP (Generic Attribute Registration Protocol) allows network switches to register and de-register attribute values with other GARP participants within a bridged LAN. GARP is a protocol that provides a generic mechanism for protocols that serve a more specific application, for example, GVRP.

#### 16.3.1.1 GARP Timers

Switches join VLANs by making a declaration. A declaration is made by issuing a Join message using GARP. Declarations are withdrawn by issuing a Leave message. A Leave All message terminates all registrations. GARP timers set declaration timeout values.

### 16.3.2 GVRP

GVRP (GARP VLAN Registration Protocol) is a registration protocol that defines a way for switches to register necessary VLAN members on ports across the network. Enable this function to permit VLANs groups beyond the local switch.

Please refer to the following table for common IEEE 802.1Q VLAN terminology.

**Table 198** IEEE 802.1Q VLAN Terminology

| VLAN PARAMETER | Term | Description |
|---|---|---|
| VLAN Type | Permanent VLAN | This is a static VLAN created manually. |
| | Dynamic VLAN | This is a VLAN configured by a GVRP registration/ deregistration process. |
| VLAN Administrative Control | Registration Fixed | Fixed registration ports are permanent VLAN members. |
| | Registration Forbidden | Ports with registration forbidden are forbidden to join the specified VLAN. |
| | Normal Registration | Ports dynamically join a VLAN using GVRP. |
| VLAN Tag Control | Tagged | Ports belonging to the specified VLAN tag all outgoing frames transmitted. |
| | Untagged | Ports belonging to the specified don't tag all outgoing frames transmitted. |
| VLAN Port | Port VID | This is the VLAN ID assigned to untagged frames that this port received. |
| | Acceptable Frame Type | You may choose to accept both tagged and untagged incoming frames or just tagged incoming frames on a port. |
| | Ingress Filtering | If set, the switch discards incoming frames for VLANs that do not have this port as a member |

## 16.4 Tagged Frames Forwarding Example

1. First the MSC1000G checks the VLAN ID (VID) of tagged frames or assigns temporary VIDs to untagged frames.
2. The MSC1000G then checks the VID in a frame's tag against the SVLAN table.
3. The MSC1000G notes what the SVLAN table says (that is, the SVLAN tells the MSC1000G whether or not to forward a frame and if the forwarded frames should have a tag).
4. Then the MSC1000G applies the port filter to finish the forwarding decision. This means that frames may be dropped even if the SVLAN says to forward them. Frames might also be dropped if they are sent to a CPE (customer premises equipment) DSL device that does not accept tagged frames.

## 16.5 Untagged Frames Forwarding Example

1. An untagged frame comes in from the LAN.
2. The MSC1000G checks the PVID table and assigns a temporary VID.

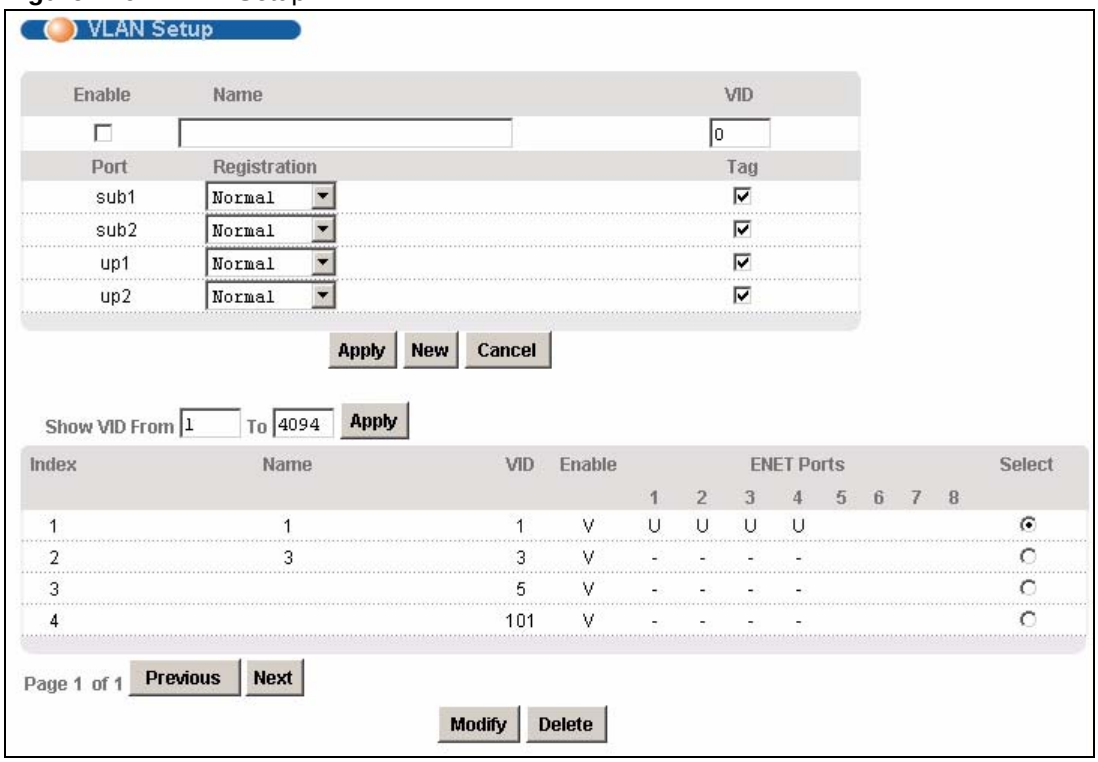
3 The MSC1000G ignores the port from which the frame came, because the MSC1000G does not send a frame to the port from which it came. The MSC1000G also does not forward frames to “forbidden” ports.

4 If after looking at the SVLAN, the MSC1000G does not have any ports to which it will send the frame, it won’t check the port filter.

## 16.6 VLAN Setup Screen

Click **VLAN > VLAN** in the navigation panel to display the screen shown next. You can assign the management switch card’s Gigabit Ethernet interfaces to be members of a VLAN group or prohibit an interface from joining a VLAN group in this screen. This is an IEEE 802.1Q VLAN.

**Figure 246** VLAN Setup




The following table describes the labels in this screen.

**Table 199** VLAN Setup

| LABEL | DESCRIPTION |
|---|---|
| Enable | Select this check box to turn on the VLAN group. You cannot disable a VLAN if any PVIDs are set to use the VLAN or the VLAN is the CPU (management) VLAN. |
| Name | Enter a descriptive name for this VLAN group for identification purposes. |
| VID | Enter the VLAN ID (VLAN Identifier) for this static VLAN entry; the valid range is between 1 and 4094. |
| Port | This is the label of a Gigabit Ethernet interface. |

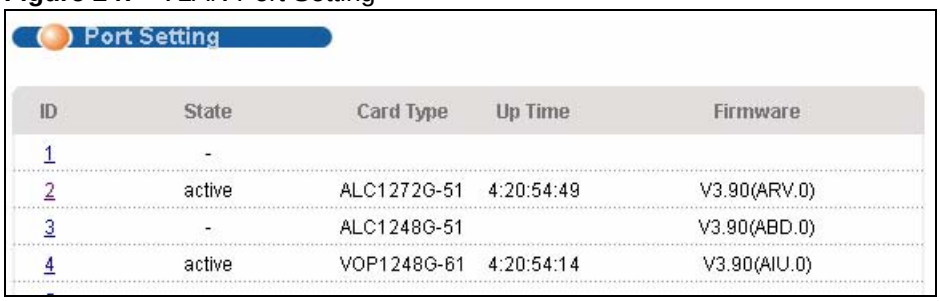
**Table 199** VLAN Setup (continued)

| LABEL | DESCRIPTION |
|---|---|
| Registration | Select **Normal** for the port to dynamically join this VLAN group using GVRP.<br>Select **Fix** for the port to be a permanent member of this VLAN group.<br>Select **Forbidden** if you want to prohibit the port from joining this VLAN group.<br>You cannot change a port from the fixed state to another state if the port's PVID is set to this VLAN. The VLAN must have at least one port set to the fixed status if the VLAN is the CPU (management) VLAN. |
| Tag | Select this check box if you want to tag all frames transmitted though a port with this VLAN group ID. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | Click **New** to start configuring the screen again. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Show VID From | Type a range of VLAN IDs that you want to view and click **Apply** to display them in the table below. |
| Index | This field displays the number of the VLAN entry in this list. |
| Name | This field displays the descriptive name for this VLAN group. |
| VID | This field displays the ID number of the VLAN group. Click the number to edit the VLAN settings. |
| Enable | This field indicates whether the VLAN settings are enabled (**V**) or disabled (**-**). |
| ENET Ports | This column displays the VLAN tagging settings of the MSC1000G' Gigabit Ethernet interfaces.<br>ENET port 1 and 2 are subtending ports 1 and 2.<br>ENET port 3 and 4 are uplink ports 1 and 2.<br>ENET ports 5~8 do not apply (and nothing displays).<br>**T** displays if the system is to tag all frames transmitted though the port with this VLAN group ID.<br>**U** displays if the system is not to tag all frames transmitted though the port with this VLAN group ID.<br>An **X** indicates that the port is forbidden (blocked) from joining the static multicast group.<br>An **-** indicates that the port is a normal member and can join the VLAN dynamically. |
| Page X of X | This identifies which page of information is displayed and the total number of pages of information. |
| Previous/Next Page | Click one of these buttons to show the preceding/following screen if the information cannot be displayed in one screen. |
| Modify | Select a VLAN's **Select** radio button and click **Modify** to edit the VLAN. |
| Delete | Select a VLAN's **Select** radio button and click **Delete** to remove the VLAN.You cannot delete the CPU (management) VLAN. |

## 16.7 VLAN Port Setting Screen

Click **VLAN > Port Setting** in the navigation panel to display the screen shown next. You can select a DSL line card to view the VLAN settings on its ports.

**Figure 247** VLAN Port Setting




The following table describes the labels in this screen.

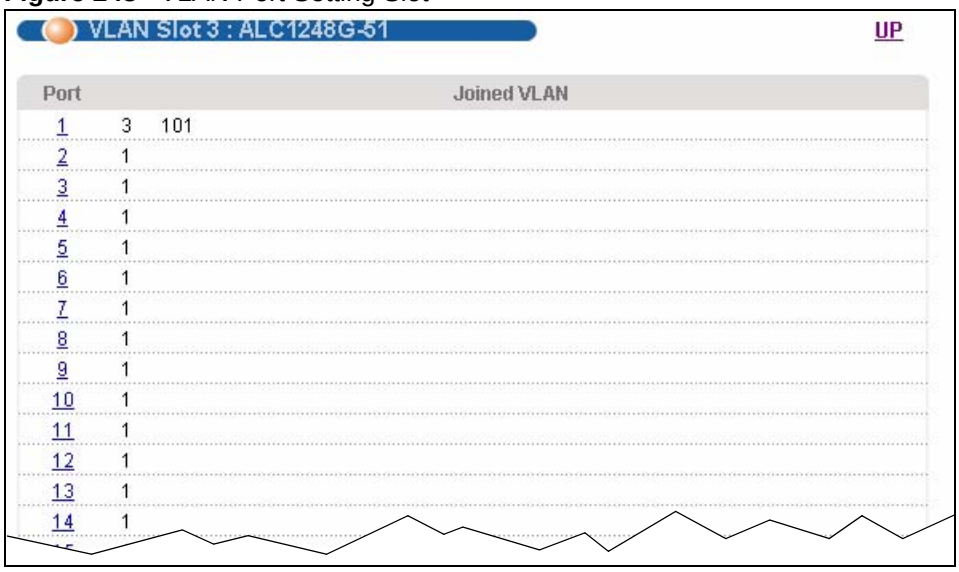
**Table 200** VLAN Port Setting

| LABEL | DESCRIPTION |
|---|---|
| ID | This is the slot number of a line card. Click the index number of an active line card to display which of the line card's ports belong to which VLANs. |
| State | This field displays the line card's current operational status.<br>**active** means the line card is operating normally.<br>**init** means the MSC1000G is initializing the line card.<br>**disable** means a manager has disabled the line card.<br>**inactive** means the line card is starting up or is not operating normally. This could be due to the card starting, a firmware upgrade in progress or a malfunction. See Section 37.6 on page 772 for what to do if the line card stays stuck in the inactive state. |
| Card Type | This field displays the type of a line card. |
| Up Time | This field displays how long the line card has been running since the last time it was started. |
| Firmware | This field displays the current firmware version installed on the line card. |

## 16.8 VLAN Port Setting Slot Screen

Click **VLAN** > **Port Setting** and then click the ID of an active DSL line card. Use this screen to view the VLAN settings on the DSL line card's ports.

**Figure 248** VLAN Port Setting Slot




The following table describes the labels in this screen.

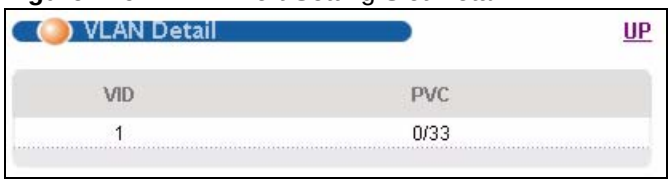
**Table 201** VLAN Port Setting Slot

| LABEL | DESCRIPTION |
|---|---|
| Port | This is the label of a DSL port. Click a port's index number to open a details screen about that port. |
| Joined VLAN | These are the VLAN IDs of all the VLANs to which the DSL port belongs. |

## 16.9 VLAN Port Setting Slot Detail Screen

Click **VLAN** > **Port Setting** and then click the ID of an active DSL line card. Click the Use this screen to view the VLAN settings on the DSL line card's ports.

**Figure 249** VLAN Port Setting Slot Detail




The following table describes the labels in this screen.

**Table 202** VLAN Port Setting Slot Detail

| LABEL | DESCRIPTION |
|---|---|
| VID | This column lists the VLAN IDs of all the VLANs to which the DSL port belongs. |
| PVC | This column list the VPI and VCI that the DSL port uses with each VLAN. |

# 17

# VoIP

This chapter shows how to configure the Voice over IP (VoIP) features on your system.

## 17.1 VoIP Overview

This section introduces VoIP, and discusses SIP and H.248 VoIP networks.

### 17.1.1 Introduction to VoIP

VoIP (Voice over IP) is the sending of voice signals over the Internet Protocol. This allows you to make phone calls and send faxes over the Internet at a fraction of the cost of using the traditional circuit-switched telephone network. You can also use servers to run telephone service applications like PBX services and voice mail. Internet Telephony Service Provider (ITSP) companies provide VoIP service.

Circuit-switched telephone networks require 64 kilobits per second (kbps) in each direction to handle a telephone call. VoIP can use advanced voice coding techniques with compression to reduce the required bandwidth.

The VOP connects POTS (Plain Old Telephone System) end-user telephone subscribers to the IP network by converting the analog voice signal into data packets and transmitting them over the network.

### 17.1.2 SIP and H.248

The IES uses a VoIP line card for VoIP communications. This line card may use either SIP (see Section 17.1.3 on page 403) or H.248 (see Section 17.1.4 on page 407), depending upon the firmware version it is currently using. You can use the same hardware with either firmware version. See your VoIP line card's User's Guide for more information.

### 17.1.3 Introduction to SIP

The Session Initiation Protocol (SIP) is an application-layer control (signaling) protocol that handles the setting up, altering and tearing down of voice and multimedia sessions over the Internet.

SIP signaling is separate from the media for which it handles sessions. The media that is exchanged during the session can use a different path from that of the signaling. SIP handles telephone calls and can interface with traditional circuit-switched telephone networks.

#### 17.1.3.1 SIP Registration

Each SIP-enabled VoIP line card in the IES is an individual SIP User Agent (UA). To provide voice service, it has an IP address for SIP and RTP protocols to communicate with other servers.

A SIP user agent has to register with the SIP registrar and must provide information about the users it represents, as well as its current IP address (for the routing of incoming SIP requests). After successful registration, the SIP server knows that the users (identified by their dedicated SIP URIs; see Section 17.1.3.3 on page 404) are represented by the UA, and knows the IP address to which the SIP requests and responses should be sent.

Registration is initiated by the User Agent Client (UAC) running in the VoIP gateway (the VOP). The gateway must be configured with information letting it know where to send the REGISTER message, as well as the relevant user and authorization data.

A SIP registration has a limited lifespan. The lifespan value is sent from the SIP server to the UAC when the UAC first registers. The UAC must renew its registration within this lifespan. If it does not do so, the registration data will be deleted from the SIP registrar's database and the connection broken.

The VOP attempts to register all enabled subscriber ports when it is switched on. When you enable a subscriber port that was previously disabled, the VOP attempts to register the port immediately.

#### 17.1.3.2 Authorization Requirements

SIP registrations (and subsequent SIP requests) require a username and password for authorization. These credentials are validated via a challenge / response system using the HTTP digest mechanism (as detailed in RFC3261, “SIP: Session Initiation Protocol”).

#### 17.1.3.3 SIP Identities

A SIP account uses an identity (sometimes referred to as a SIP address). A complete SIP identity is called a SIP URI (Uniform Resource Identifier). A SIP account's URI identifies the SIP account in a way similar to the way an e-mail address identifies an e-mail account. The format of a SIP identity is SIP-Number@SIP-Service-Domain.

#### 17.1.3.4 SIP Number

The SIP number is the part of the SIP URI that comes before the “@” symbol. A SIP number can use letters like in an e-mail address (johndoe@your-ITSP.com for example) or numbers like a telephone number (1122334455@VoIP-provider.com for example).

#### 17.1.3.5 SIP Service Domain

The SIP service domain of the VoIP service provider (the company that lets you make phone calls over the Internet) is the domain name in a SIP URI. For example, if the SIP address is 1122334455@VoIP-provider.com, then “VoIP-provider.com” is the SIP service domain.

#### 17.1.3.6 SIP Servers and Clients

SIP is a client-server protocol. A SIP client is an application program or device that sends SIP requests. A SIP server responds to the SIP requests.

When you use SIP to make a VoIP call, it originates at a client and terminates at a server. A SIP client could be a computer or a SIP phone. One device can act as both a SIP client and a SIP server.

### 17.1.3.7 SIP User Agent

A SIP user agent can make and receive VoIP telephone calls. A User Agent Client (UAC) is a logical entity that initiates a SIP request, and a User Agent Server (UAS) is a logical entity that creates a response to a SIP request. These logical entities last only as long as the duration of the transaction they have initiated or responded to. So, a piece of software can act as the UAC in one call and the UAS in another.

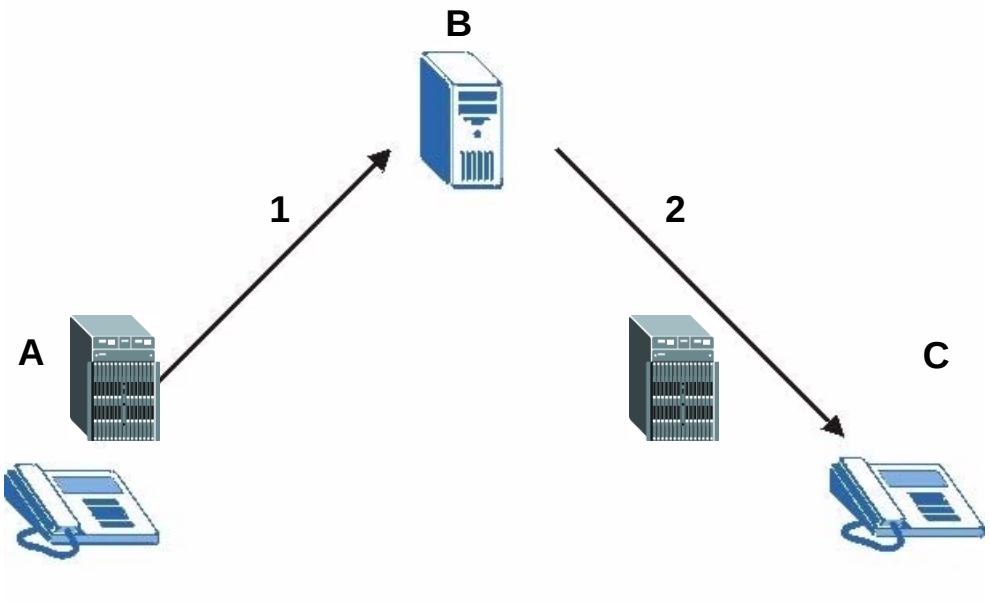
### 17.1.3.8 SIP Proxy Server

A SIP proxy server receives requests from clients and forwards them to another server.

In the following example, you want to use a telephone connected to client device **A** to call someone who is using a telephone connected to client device **C**. In this example, **A** is the UAC and **C** is the UAS.

1. The client device (**A** in the figure) sends a call invitation to the SIP proxy server (**B**).
2. The SIP proxy server forwards the call invitation to **C**.

**Figure 250** SIP Proxy Server




### 17.1.3.9 SIP Registrar Server

A SIP registrar server (also known as a register server) maintains a database of SIP identity-to-IP address (or domain name) mapping. The registrar server checks your user name and password when you register.

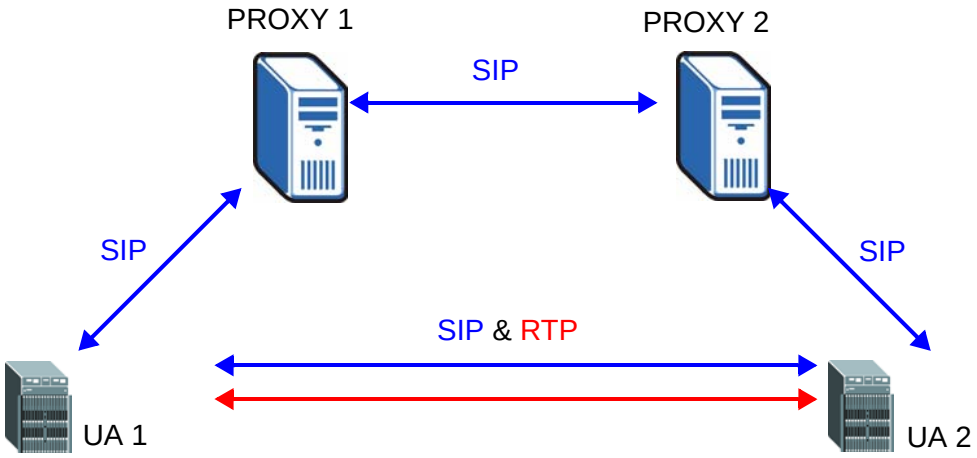
### 17.1.3.10 SIP Call Progression

Usually, the SIP UAC sets up a phone call by sending a request to the SIP proxy server. Then, the proxy server looks up the destination to which the call should be forwarded (according to the URI requested by the SIP UAC). The request may be forwarded to more than one proxy server before arriving at its destination.

The response to the request goes to all the proxy servers through which the request passed, in reverse sequence. Once the session is set up, session traffic is sent between the UAs directly, bypassing all the proxy servers in between.

The following figure shows the SIP and session traffic flow between the user agents (**UA 1** and **UA 2**) and the proxy servers (this example shows two proxy servers, **PROXY 1** and **PROXY 2**).

**Figure 251** SIP Call Through Proxy Servers




The following table shows the SIP call progression.

**Table 203** SIP Call Progression

| UA 1 | | PROXY 1 | | PROXY 2 | | UA 2 |
|---|---|---|---|---|---|---|
| Invite | → | | | | | |
| | | Invite | → | | | |
| | | 100 Trying | ← | Invite | → | |
| | | | | 100 Trying | ← | |
| | | | | | | 180 Ringing ← |
| | | | | 180 Ringing | ← | |
| | | 180 Ringing | ← | | | |
| | | | | | | 200 OK ← |
| | | | | 200 OK | ← | |
| | | 200 OK | ← | | | |
| ACK | → | | | | | |
| RTP | ↔ | | | | | RTP |
| | | | | | | BYE ← |
| 200 OK | → | | | | | |

1. **User Agent 1** sends a SIP INVITE request to **Proxy 1**. This message is an invitation to **User Agent 2** to participate in a SIP telephone call. **Proxy 1** sends a response indicating that it is trying to complete the request.
2. **Proxy 1** sends a SIP INVITE request to **Proxy 2**. **Proxy 2** sends a response indicating that it is trying to complete the request.

3. **Proxy 2** sends a SIP INVITE request to **User Agent 2**.
4. **User Agent 2** sends a response back to **Proxy 2** indicating that the phone is ringing. The response is relayed back to **User Agent 1** via **Proxy 1**.
5. **User Agent 2** sends an OK response to **Proxy 2** after the call is answered. This is also relayed back to **User Agent 1** via **Proxy 1**.
6. **User Agent 1** and **User Agent 2** exchange RTP packets containing voice data directly, without involving the proxies.
7. When **User Agent 2** hangs up, he sends a BYE request.
8. **User Agent 1** replies with an OK response confirming receipt of the BYE request, and the call is terminated.

### 17.1.4 Introduction to H.248

The H.248 protocol, also known as MEGACO (MEdia GAteway COntrol) or the Gateway Control Protocol, defines a VoIP network in which basic functions (such as voice coding and decoding) are performed by one device, and higher functions (such as setting up and managing calls) are performed by another.

The H.248 protocol was developed jointly by the IETF (Internet Engineering Task Force) and the ITU (International Telecommunication Union). It is defined by the IETF in RFC 3525, and by the ITU in ITU-T H.248-1.

While SIP (Session Initiation Protocol) VoIP networks have no separate control unit, relying instead upon intelligent endpoints, an H.248 VoIP network has a single intelligent control unit, which manages a network of dumb endpoint devices.

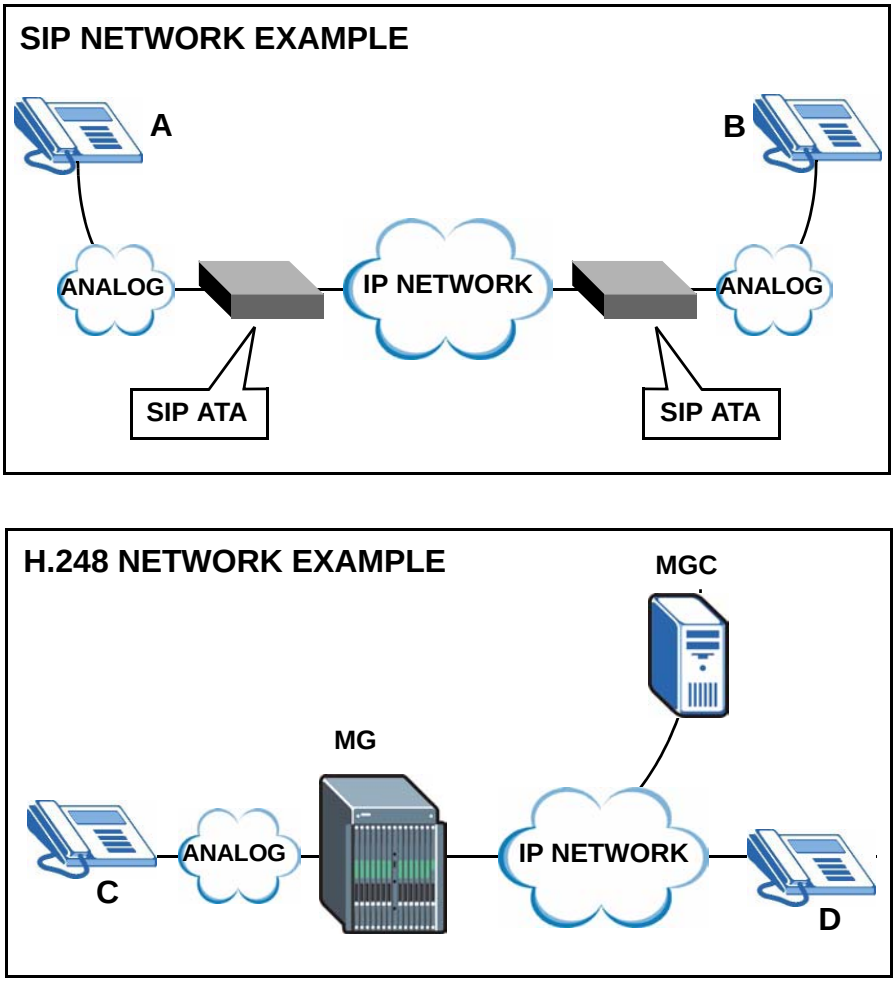
An H.248 VoIP network consists of one or more media gateways and a media gateway controller.

- Media gateways (MGs) encode and decode voice data, transmitting it from one network to another (for example, from the PSTN to an IP network, and vice versa). The H.248-enabled VoIP line cards are MGs.
- Media gateway controllers (MGCs) are intelligent devices that manage the media gateways. They set up, manage and tear down calls by providing instructions to the MGs.

The figure that follows compares a basic SIP network with an H.248 network.

- In the SIP example, analog telephones **A** and **B** each connect to a **SIP ATA** (Analog Telephone Adaptor). The **ATA**s not only encode and decode the voice data between the analog and IP networks, but also set up, maintain and end the call.
- In the H.248 example, the **MG** allows the users of analog telephone **C** and IP telephone **D** to communicate by reporting events to the **MGC** (for example, if the user of phone **C** dials a sequence of numbers). The MGC interprets the information according to its programming and issues the relevant commands to the **MG** (for example, telling the **MG** how to connect phones **C** and **D** in a call, or telling the **MG** to play a busy tone to phone **C**). See Section 17.1.4.3 on page 410 for a detailed example of H.248 call progression.

**Figure 252** SIP and H.248 Network Comparison




### 17.1.4.1 Media Gateway Terminology

Communication in an H.248 network depends on two concepts contained in the MG: "Terminations" and "Contexts".

- A Termination is a logical entity representing a connection to a media stream. A Termination sources and/or sinks connections to the media stream. Every connection to the MG is uniquely represented by a Termination.

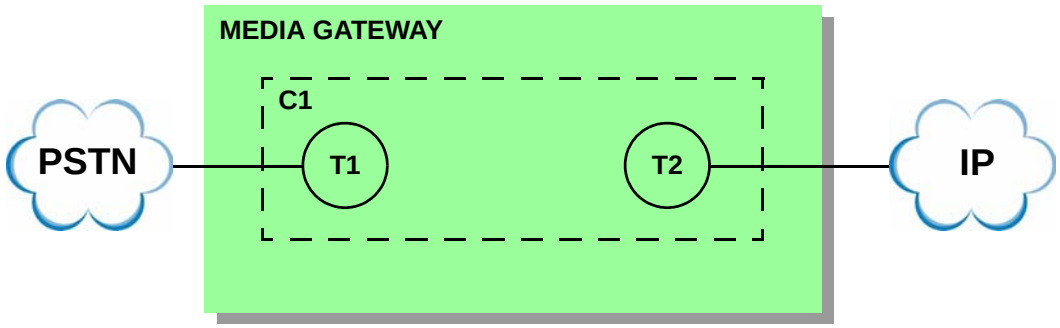
  A Termination may represent either a physical connections (such as an analog phone connection) or an ephemeral connection (such as an RTP stream). Generally, ephemeral Terminations exist for only as long as they are in use. In contrast, physical Terminations exist for as long as they are provisioned in the gateway.

  Each Termination is assigned a unique identity at the moment of its creation by the MG.
- A Context is a grouping of Terminations. Terminations within the same Context can intercommunicate. A Termination can belong to only one Context at a time, and Contexts cannot intercommunicate. Contexts connect two or more Terminations, with the exception of one - the Null Context. The Null Context contains all physical Terminations not currently belonging to another Context. Terminations in the Null Context cannot intercommunicate.

A Context is created when the MGC adds the first Termination to the Context. A Context is destroyed when the last Termination is removed from the Context.

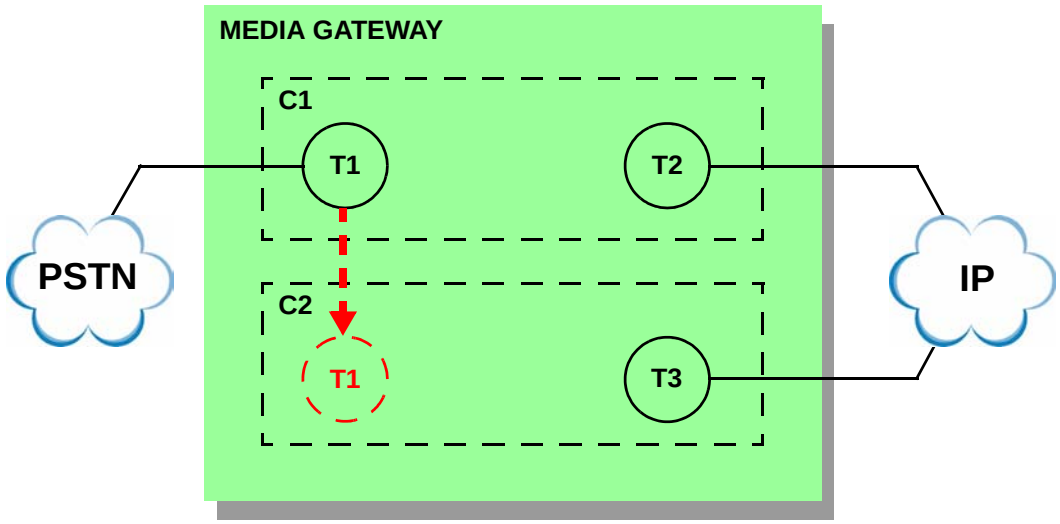
The following figure shows an example Context, **C1**. This Context possesses two Terminations, **T1** and **T2**. **T1** is a PSTN connection, **and** T2 is an IP connection. Because both Terminations belong to the same Context, they can communicate.

**Figure 253** H.248 Connection Example




Terminations can move from one Context to another. In the next example, the MG has two Contexts, **C1** and **C2**. There are currently three active Terminations; **T1**, **T2** and **T3**. **T3** tries to call **T1**, but **T1** is engaged in a call with **T2** (in Context **C1**). When the call is completed, **T1** moves to Context **C2** and begins the call with **T3** (in this example, the MG must support call waiting).

**Figure 254** H.248 Call Waiting Example




Each Termination has the following attributes: “properties”, “events”, “signals” and “statistics”.

- **Properties** describe aspects of the Termination (defining it, for example, as representing an RTP stream).
- **Events** are call-related occurrences such as off-hook, digits dialed, on-hook, and so on. Events may trigger messages to the MGC, or may result in action taken by the MG.

- **Signals** are instructions applied to Terminations by the MG when requested to do so by the MGC. The type and content of signals depends on the type of Termination (switched circuit network channel, RTP stream, etc.). Signals include media streams such as DTMF tones and audio messages.
- **Statistics** are information related to a Termination's activity in a Context, and are sent to the MGC on request, or when the Termination is removed from the Context.

### 17.1.4.2 H.248 Commands

In an H.248 network, the MGC controls calls by issuing commands to the Media Gateways. In turn, the media gateways can issue reports to the MGC. The commands allow control of Terminations and Contexts. For example, the MGC can specify what events a Termination should log and report, which Terminations should exist in which Contexts, and which signals the MG should apply to a Termination.

Commands and reports are grouped into Transactions. Each Transaction consists of a number of actions, which must all refer to the same Context. To verify that Transactions have been correctly sent and received, each Transaction must be preceded by a TransactionRequest message and concluded with a TransactionReply message. In addition, a TransactionPending message indicates that a Transaction has been initiated, and is being processed, but is not complete.

The following table lists the H.248 commands.

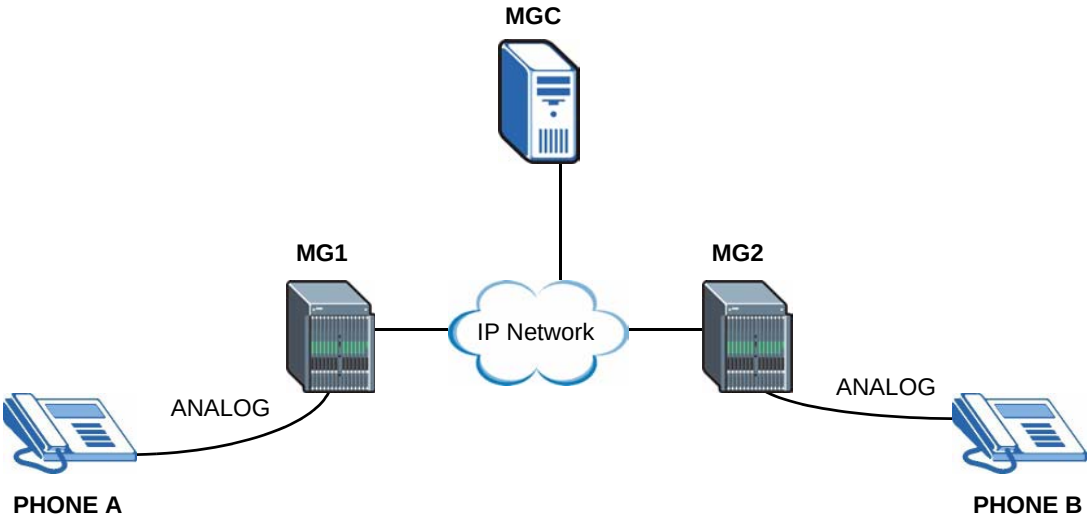
**Table 204** H.248/MEGACO Commands

| COMMAND | DESCRIPTION |
|---|---|
| Add | Adds a Termination to a Context. If a Termination does not already exist, it is created by this command. |
| Modify | Alters a Termination's events, properties and signals. |
| Subtract | Removes a Termination from a Context and sends statistics to the MGC on the Termination's activities in the Context. Ephemeral Terminations are destroyed by this command. |
| Move | Moves a Termination from one Context to another. |
| AuditValue | Sends information on a Termination's current events, properties and signals. |
| AuditCapabilities | Sends information on all possible properties, events and signals permitted by the MG. |
| Notify | Sent by the MG to the MGC to inform the MGC of events. |
| ServiceChange | Sent by the MG to the MGC, or vice versa, indicating that one or more Terminations is about to be removed from service, or has been returned to service. |

### 17.1.4.3 H.248/MEGACO Call Progression Example

The following figure shows two analog telephones (**A** and **B**) connected to two media gateways (**MG1** and **MG2**). **MG1** and **MG2** are connected to one another via an IP network. **MG1** and **MG2** are controlled by the media gateway controller **MGC**.

**Figure 255** H.248/MEGACO Call Procedure Example




The user of phone **A** wants to call the user of phone **B**. The following table shows the series of actions necessary to set up the network and make the call (TransactionRequests and TransactionReplies are not shown).

This table illustrates the actions taken in setting up, conducting, and tearing down a call. However, some of the actions may take place simultaneously (for instance, when the MGC instructs MG1 and MG2 to switch to Listening mode). Also, the commands necessary to perform some series of actions may be sent in the same Transaction.

**Table 205** H.248/MEGACO Call Procedure Example

| DIRECTION | ACTION | COMMAND |
|---|---|---|
| MG1 --> MGC | MG1 registers with MGC and reports its capabilities to the MGC. | ServiceChange |
| MG2 --> MGC | MG2 registers with MGC and reports its capabilities to the MGC. | ServiceChange |
| MGC --> MG1 | MGC sets MG1 to listening mode. | Modify |
| MGC --> MG2 | MGC sets MG2 to listening mode. | Modify |
| Phone A --> MG1 | User of phone A lifts the receiver off-hook. MG1 detects off-hook. | N/A |
| MG1 --> MGC | MG1 reports phone A off-hook to MGC. | Notify |
| MGC --> MG1 | MGC instructs MG1 to play the relevant dial tone to Phone A. | Modify |
| Phone A --> MG1 | User of phone A dials phone B's number. | N/A |

**Table 205** H.248/MEGACO Call Procedure Example

| DIRECTION | ACTION | COMMAND |
|---|---|---|
| MG1 --> MGC | MG1 informs MGC of the dialed number. MGC examines dialed number, which correlates with phone connected to MG2. | Notify |
| MGC --> MG1 | MGC creates RTP Termination in MG1 (in the same Context as Phone A's existing analog Termination). | Add |
| MGC --> MG2 | MGC creates RTP Termination in MG2 (in the same Context as Phone B's analog Termination). | Add |
| MGC --> MG1 | MGC modifies RTP Termination, providing information on how to send RTP stream to MG2. | Modify |
| MGC --> MG1 | MGC modifies Analog Termination on MG1 to send ringing tone to phone A. | Modify |
| MG1 --> Phone A | MG1 send ringing tone to phone A. | N/A |
| MG2 --> Phone B | MG2 rings phone B. | N/A |
| Phone B --> MG2 | User of phone B picks up. MG2 detects off-hook. | N/A |
| MG2 --> MGC | MG2 reports to MGC that phone B is off-hook. | Notify |
| MGC --> MG1 | MGC modifies analog Termination on MG1 to stop playing ringing tone to phone A. | Modify |
| MGC --> MG2 | MGC modifies analog Termination on MG2 to stop ringing phone B. | Modify |
| MGC --> MG1 | MGC modifies RTP Termination on MG1 to transfer media with RTP Termination on MG2. | Modify |
| MGC --> MG2 | MGC modifies RTP Termination on MG2 to transfer media with RTP Termination on MG1. | Modify |
| Phone A --> MG1 | User of phone A finishes call and replaces receiver on hook. | N/A |
| MG1 --> MGC | MG1 reports on-hook to MGC. | Notify |
| MGC --> MG1 | MGC removes MG1's RTP Termination from its Context. The RTP Termination is ephemeral and is destroyed. | Subtract |
| MGC --> MG1 | MGC removes phone A's analog Termination from its Context. The Context is destroyed. The analog Termination is physical and returns to the Null Context. | Subtract |
| MGC --> MG2 | MGC removes MG2's RTP Termination from its Context. The RTP Termination is ephemeral and is destroyed. | Subtract |
| MGC --> MG2 | MGC removes phone B's analog Termination from its Context. The Context is destroyed. The analog Termination is physical and returns to the Null Context. | Subtract |

#### 17.1.4.4 H.248 and the IES

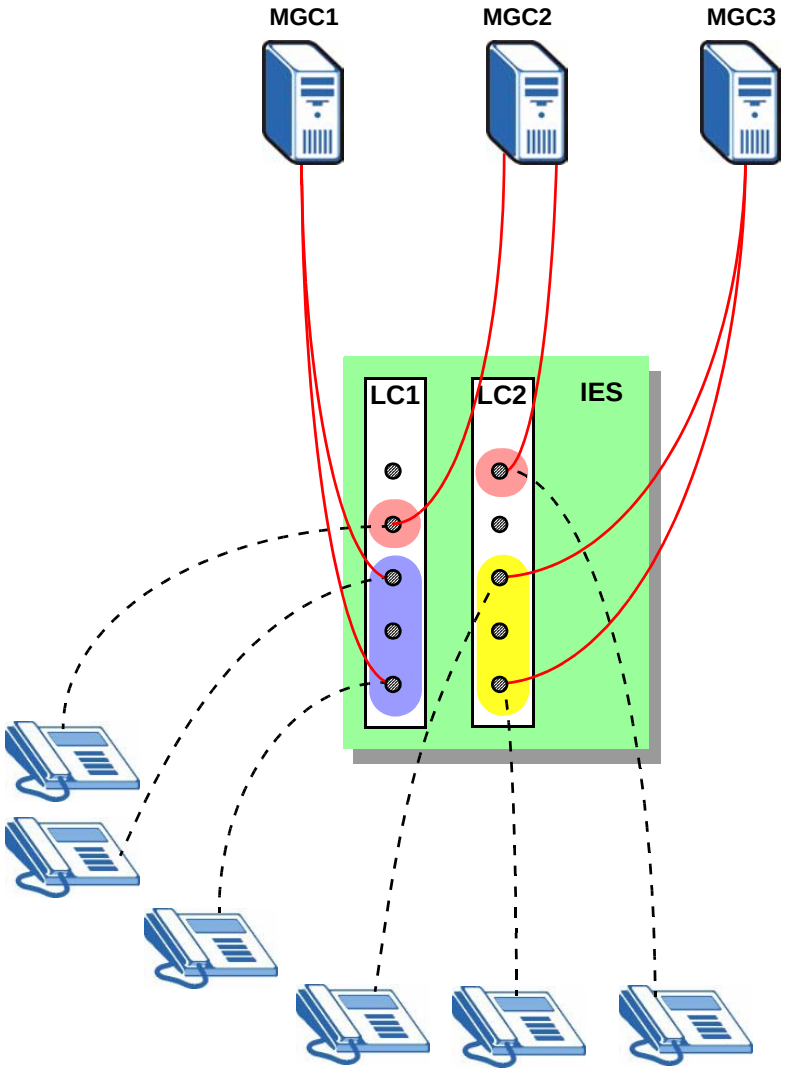
The IES's H.248-enabled VoIP line cards are media gateways. You must configure them to associate with an media gateway controller in order to make calls through the line cards.

- Each of the IES's H.248-enabled line cards supports multiple media gateways. Each is defined by an MG profile. Configure MG profiles in the **VoIP** > **VoIP H248** screen.
- Each MG profile requires specific information about a media gateway controller with which it is to associate. This information is specified in an H.248 profile. Configure H.248 profiles in the **Profile** > **VoIP H248** screen.

- You can assign each port in a line card to use a specific MG profile. Specify which MG profile a port uses in the **Port** > **VoIP H248** screen.

The following figure shows telephones connected to the IES's H.248-enabled VoIP line cards (**LC1** and **LC2**). The line cards use a variety of MG profiles to associate with different media gateway controllers (**MGC1**, **2** and **3**). The dashed black lines indicate an analog connection between the telephone and the VoIP line card, and the solid red lines indicate an association between the media gateways on each line card, and their respective media gateway controllers.

**Figure 256** Multiple Media Gateway Profiles Example




## 17.1.5 RTP

When you make a VoIP call using SIP or H.248, the RTP (Real time Transport Protocol) is used to handle voice data transfer. See RFC 1889 for details on RTP.

## 17.1.6 Voice Coding

A codec (coder/decoder) codes analog voice signals into digital signals and decodes the digital signals back into voice signals. The VOP supports the following codecs.

- **G.711** is a Pulse Code Modulation (PCM) waveform codec. PCM measures analog signal amplitudes at regular time intervals (sampling) and converts them into digital bits (quantization). Quantization "reads" the analog signal and then "writes" it to the nearest digital value. For this reason, a digital sample is usually slightly different from its analog original (this difference is known as "quantization noise").

  G.711 provides very good sound quality but requires 64kbps of bandwidth.
- **G.723.1** uses Low-Delay Code-Excited Linear Prediction (LD-CELP) to code audio in 30-millisecond frames. The standard supports two bitrates, 6.3 kbps and 5.3 kbps.[3] G.723.1 provides toll-quality sound and requires very little bandwidth.
- **G.726** is an Adaptive Differential Pulse Code Modulation (ADPCM) waveform codec that uses a lower bitrate than standard PCM conversion.

  Differential (or Delta) PCM is similar to PCM, but encodes the audio signal based on the difference between one sample and a prediction based on previous samples, rather than encoding the sample's actual quantized value. Many thousands of samples are taken each second, and the differences between consecutive samples are usually quite small, so this saves space and reduces the bandwidth necessary.

  However, DPCM produces a high quality signal (high signal-to-noise ratio or SNR) for high difference signals (where the actual signal is very different from what was predicted) but a poor quality signal (low SNR) for low difference signals (where the actual signal is very similar to what was predicted). This is because the level of quantization noise is the same at all signal levels. Adaptive DPCM solves this problem by adapting the difference signal's level of quantization according to the audio signal's difference level. A low difference signal is given a higher quantization level, increasing its signal-to-noise ratio. This provides a similar sound quality at all signal levels.

  G.726 operates at 16, 24, 32 or 40 kbps.
- **G.729** is an Analysis-by-Synthesis (AbS) hybrid waveform codec. It uses a filter based on information about how the human vocal tract produces sounds. The codec analyzes the incoming voice signal and attempts to synthesize it using its list of voice elements. It tests the synthesized signal against the original and, if it is acceptable, transmits details of the voice elements it used to make the synthesis. Because the codec at the receiving end has the same list, it can exactly recreate the synthesized audio signal.

  G.729 provides good sound quality and reduces the required bandwidth to 8kbps.

## 17.1.7 PSTN Call Setup Signaling

PSTNs (Public Switched Telephone Networks) use DTMF or pulse dialing to set up telephone calls.

Dual-Tone Multi-Frequency (DTMF) signaling uses pairs of frequencies (one lower frequency and one higher frequency) to set up calls. It is also known as Touch Tone®. Each of the keys on a DTMF telephone corresponds to a different pair of frequencies.

Pulse dialing sends a series of clicks to the local phone office in order to dial numbers.[4]

3. At the time of writing, the VOP supports the 5.3 kbps bitrate only.

#### 17.1.7.1 VoIP VLAN

Virtual Local Area Network (VLAN) allows a physical network to be partitioned into multiple logical networks. Only stations within the same VLAN can communicate with each other.

The system can add IEEE 802.1Q VLAN ID tags to voice frames that it sends to the network. This allows the system to communicate with a SIP server that is a member of the same VLAN group. Some ISPs use the VLAN tag to identify voice traffic and give it priority over other traffic.

## 17.2 Using Call Services

The VOP supports a variety of call services such as call hold, call waiting, do not disturb, and so on. These services can be accessed by a user from a telephone connected to the VOP (if the service is activated in the **VoIP** > **Call Service Profile** screen - see Section 12.17 on page 287). The following table shows the default key patterns used to access the supported services.

**Table 206** Using Call Services

| FUNCTION | KEY CODE |
|---|---|
| Turn do not disturb on. | *99# |
| Turn do not disturb off. | #99# |
| Enable call waiting. | *43# |
| Disable call waiting. | #43# |
| Call waiting: reject new call. | Flash 0 |
| Call waiting: accept new call and disconnect current call. | Flash 1 |
| Call waiting: accept new call and put current call on hold. | Flash 2 |
| Turn Caller Line Identification Restriction (CLIR) on. | ## |
| Call Transfer. | *98# |
| Call In. | #14 |

If the system is restarted, the do not disturb setting returns to its default (off).

### 17.2.1 Do Not Disturb

When Do Not Disturb (DND) is activated on a port, all incoming calls on that port are rejected.

4. The VOP supports DTMF at the time of writing.

#### 17.2.1.1 Activating Do Not Disturb

Take the following steps to activate DND on one of the VOP's ports.

Using a telephone connected to the port:

1. Dial "*99#".
2. Enter the number of hours and minutes from the present time that DND should take effect in the format **hhmm** (so you would enter 0145 for one hour and forty-five minutes, for example). Allowed digits for hours are 0~9 and allowed digits for minutes are 0~5.
3. Enter the number of hours and minutes that DND should remain in effect in the format **hhmm**. Allowed digits for hours are 0~9 and allowed digits for minutes are 0~5.

If you hear two beeps, the procedure was successful.

#### 17.2.1.2 Deactivating Do Not Disturb

To deactivate DND on one of the VOP's ports, dial "#99#" using a telephone connected to the port. Alternatively, dial "*99#0000".

If you hear two beeps, the procedure was successful.

### 17.2.2 Call Waiting

Call waiting allows a user, engaged in a call, to hear an indication that a second call is incoming. The user can then choose to reject the second call, accept the second call and hold the first call, or accept the second call and terminate the first call.

#### 17.2.2.1 Activating Call Waiting

To activate call waiting on one of the VOP's ports, dial "*43#" using a telephone connected to the port.

If you hear two beeps, the procedure was successful.

#### 17.2.2.2 Deactivating Call Waiting

To deactivate call waiting on one of the VOP's ports, dial "#43#" using a telephone connected to the port.

If you hear two beeps, the procedure was successful.

#### 17.2.2.3 Rejecting and Accepting Incoming Calls

To reject a second incoming call, press **Flash** then **0**.

To accept a second incoming call and terminate the first call, press **Flash** then **1**.

To accept a second incoming call and put the first call on hold, press **Flash** then **2**.

### 17.2.3 CLIR

When Calling Line Identification Restriction (CLIR) is active on one of the VOP's ports, Caller ID is not sent for outgoing calls on the port.

#### 17.2.3.1 Activating CLIR

To activate CLIR on one of the VOP's ports, dial "##" on a telephone connected to the port before you dial the phone number.

This activates CLIR on the current call only.

## 17.2.4 Call Transfer

Call transfer allows a user to forward an incoming call to another phone number. The VOP supports three types of call transfer: blind transfer, attendant transfer and consultative transfer.

#### 17.2.4.1 Making a Blind Transfer

In a blind transfer the caller (A) is transferred by the callee (B) to the second callee (C). B and C do not talk to one another.

Take the following steps to make a blind transfer on a phone connected to the VOP.

1. During a call, press the Flash key. This puts the caller on hold.
2. Dial "*98#" then the number to which you want to transfer the call.
3. Hang up. The call is transferred.

#### 17.2.4.2 Making a Consultative Transfer

In a consultative transfer, the caller (A) is transferred by the callee (B) to the second callee (C) after B and C talk to one another. In a consultative transfer, A does not have the option of not transferring A's call to C.

Take the following steps to make a consultative transfer on a phone connected to the VOP.

1. During a call, press the Flash key. This puts the caller on hold.
2. Dial "*98#" then the number to which you want to transfer the call.
3. Hang up. The call is transferred.

#### 17.2.4.3 Making an Attendant Transfer

In an attendant transfer, the caller (A) is transferred by the callee (B) to the second callee (C) after B and C talk to one another. However, in an attendant transfer B has the option of not transferring A's call to C.

Take the following steps to make an attendant transfer on a phone connected to the VOP.

1. During a call, press the Flash key. This puts the caller on hold.
2. Dial the number to which you want to transfer the call.
3. When the call is picked up - and you find out whether the other person wants to accept the call or not - press the Flash key and then dial "*98#". The call is transferred.

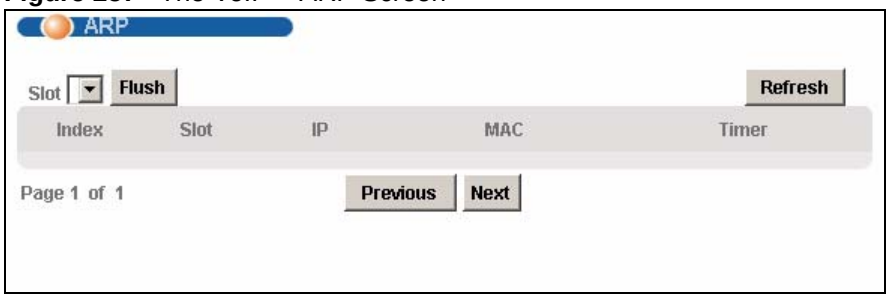
## 17.3 The VoIP ARP Screen

Address Resolution Protocol (ARP) is a protocol for mapping an Internet Protocol address (IP address) to a physical machine address, also known as a Media Access Control or MAC address, on the local area network.

Use the **VoIP ARP** screen to manage the IP addresses assigned to the VoIP cards in the IES.

Click **VoIP** > **ARP**. The following screen displays.

**Figure 257** The VoIP > ARP Screen




The following table describes the labels in this screen.

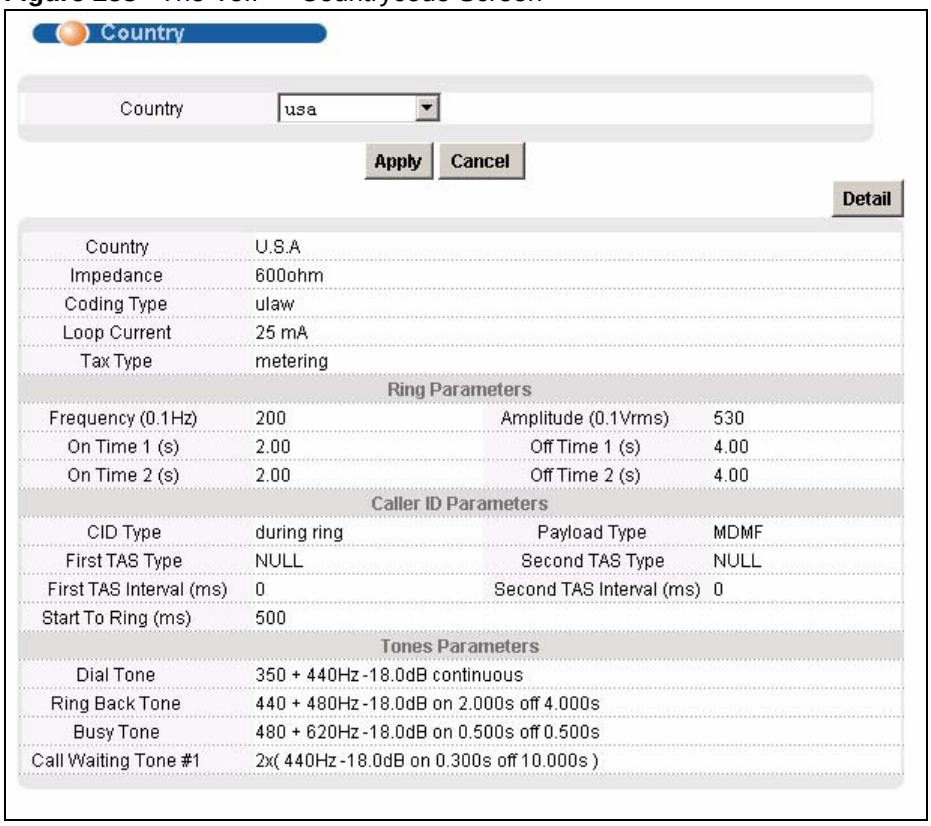
**Table 207** The VoIP > ARP Screen

| LABEL | DESCRIPTION |
|---|---|
| Slot | Use the drop-down list box to select the active VoIP line card you want to manage. |
| Flush | Click this to remove all the entries from the ARP table. |
| Refresh | Click this to reload the information in the ARP table. |
| Index | This is the ARP table entry number. |
| Slot | This displays the line card number. |
| IP | This is the learned IP address of a device connected to a port. |
| MAC | This is the MAC address of the device with the listed IP address. |
| Timer | This is the time (in seconds) until the entry expires (if there is no activity on the IP address). |
| Previous | Click this to show the preceding ARP table screen (if the number of learned IP addresses cannot be shown on a single page). |
| Next | Click this to show the following ARP table screen (if the number of learned IP addresses cannot be shown on a single page). |

## 17.4 The VoIP Countrycode Screen

Use this screen to configure the regional VoIP settings of the IES, and to see details of the VoIP settings affected by the country of operation you select. Click **VoIP** > **Countrycode**. The following screen displays.

**Figure 258** The VoIP > Countrycode Screen


Country
Country
usa
Apply
Cancel
Detail
Country U.S.A
Impedance 600ohm
Coding Type ulaw
Loop Current 25 mA
Tax Type metering
Ring Parameters
Frequency (0.1Hz) 200
Amplitude (0.1Vrms) 530
On Time 1 (s) 2.00
Off Time 1 (s) 4.00
On Time 2 (s) 2.00
Off Time 2 (s) 4.00
Caller ID Parameters
CID Type during ring
Payload Type MDMF
First TAS Type NULL
Second TAS Type NULL
First TAS Interval (ms) 0
Second TAS Interval (ms) 0
Start To Ring (ms) 500
Tones Parameters
Dial Tone 350 + 440Hz -18.0dB continuous
Ring Back Tone 440 + 480Hz -18.0dB on 2.000s off 4.000s
Busy Tone 480 + 620Hz -18.0dB on 0.500s off 0.500s
Call Waiting Tone #1 2x( 440Hz -18.0dB on 0.300s off 10.000s )

The following table describes the labels in this screen.

**Table 208** The VoIP > Countrycode Screen

| LABEL | DESCRIPTION |
|---|---|
| Country | Select the country in which the system will be used. |
| Apply | Click this to save your changes and display the region-specific VoIP settings below. |
| Cancel | Click this to return this screen to its last-saved values. |
| Detail | Click this to display information about the system's current pulse, meter and tone parameters not displayed in this screen (see Section 17.5 on page 420). |
| Country | This field displays the country you select from the **Country** drop-down list box. |
| Impedance | Displays the line impedance or impedance range in ohms. |
| Coding Type | This displays either **alaw** or **ulaw**. The a-law companding algorithm is commonly used in Europe, while the u-law (mu-law or µ-law) algorithm is commonly used in the USA and Japan. |
| Loop Current | Displays the supplied line current in milliamps. |
| Tax Type | Displays the payphone charging signal type; **metering** (12/16 Hz signal) or **reversebattery** (polarity reversal signal). |
| Ring Parameters | This section displays region-specific information about the phone's ring. |
| Frequency (0.1Hz) | This displays the frequency of the phone ring in decihertz. |
| Amplitude (0.1Vrms) | This displays the amplitude of the phone ring in Volts root-mean-squared. |
| On Time 1 (s) | This displays the duration of the first ring (in seconds). |

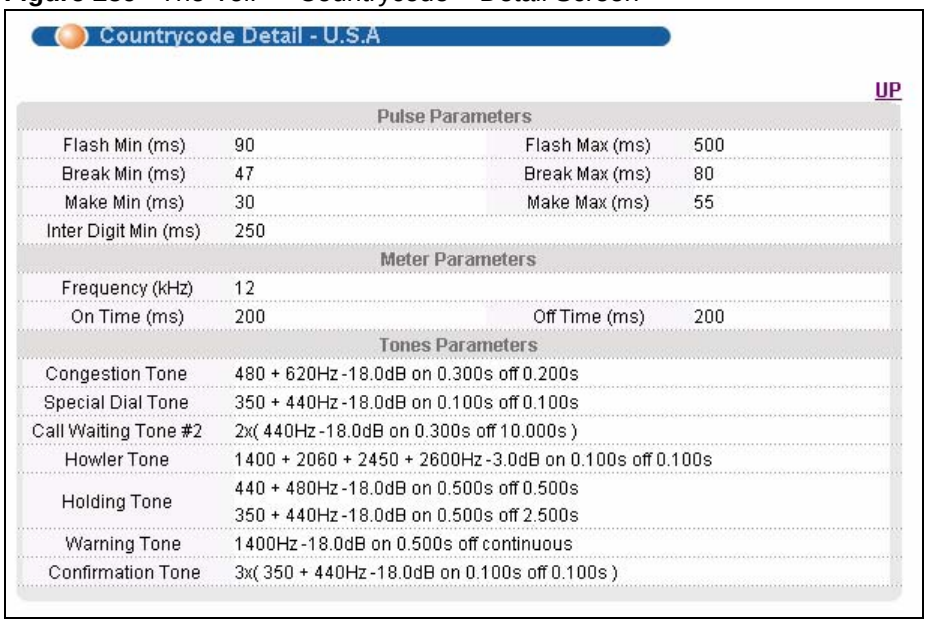
**Table 208** The VoIP > Countrycode Screen

| LABEL | DESCRIPTION |
|---|---|
| Off Time 1 (s) | This displays the length of time between the first and second ring (in seconds). |
| On Time 2 (s) | This displays the duration of the second ring (in seconds). |
| Off Time 2 (s) | This displays the wait time after the second ring before the first ring is sent again (in seconds). |
| Caller ID Parameters | This section displays region-specific information about caller ID |
| CID type | This displays whether the caller ID information is sent before the ring (**prior ring** displays) or at the same time as the ring (**during ring** displays). |
| Payload Type | This displays the caller ID payload type.<br>**SDMF** displays if caller ID uses the Single Data Message Format (which transmits caller number, date and time).<br>**MDMF** displays if caller ID uses the Multiple Data Message Format (which transmits caller name, number, date and time). |
| First TAS Type | TAS (Terminal equipment Alerting Signal) is a tone sent prior to the transmission of caller ID information. This is the primary TAS signal type, which is used in a line reversal scenario.<br>The possible values are:<br>NULL: No TAS signal is sent.<br>DT_AS: Dual Tone Alerting Signal.<br>RP_AS: Ringing Pulse Alerting Signal.<br>Line_Reversal: Simple line polarity inversion. |
| First TAS Interval (ms) | This is the first TAS timeout period in milliseconds. |
| Second TAS Type | This is the secondary TAS signal type, which is used in a line reversal followed by DT-AS/RP-AS scenario.<br>NULL: No TAS signal is sent.<br>DT_AS: Dual Tone Alerting Signal.<br>RP_AS: Ringing Pulse Alerting Signal. |
| Second TAS Interval (ms) | This is the second TAS timeout period in milliseconds. |
| Start To Ring (ms) | This is the wait time between the caller ID information being sent and the ring signal being sent (available for the prior ring type only). |
| Tones Parameters | This section displays region-specific information about call progress tones. |
| Dial Tone | This is the tone sent to indicate that a call can be dialled. |
| Ring Back Tone | This is the tone sent to indicate that the callee's phone is ringing. |
| Busy Tone | This is the tone sent to indicate that the callee's line is busy. |
| Call Waiting Tone #1 | This is the tone sent to indicate that a second call is incoming while the first is still in progress. |

## 17.5 The Countrycode Detail Screen

Use this screen to see details about the MSC1000G's current pulse, meter and tone parameters not displayed in the **Countrycode** screen (see Section 17.4 on page 418). Click the **Detail** button in the **VoIP** > **Countrycode** screen. The following screen displays.

**Figure 259** The VoIP > Countrycode > Detail Screen


Countrycode Detail - U.S.A
UP
Pulse Parameters
Flash Min (ms) 90
Flash Max (ms) 500
Break Min (ms) 47
Break Max (ms) 80
Make Min (ms) 30
Make Max (ms) 55
Inter Digit Min (ms) 250
Meter Parameters
Frequency (kHz) 12
On Time (ms) 200
Off Time (ms) 200
Tones Parameters
Congestion Tone 480 + 620Hz -18.0dB on 0.300s off 0.200s
Special Dial Tone 350 + 440Hz -18.0dB on 0.100s off 0.100s
Call Waiting Tone #2 2x( 440Hz -18.0dB on 0.300s off 10.000s )
Howler Tone 1400 + 2060 + 2450 + 2600Hz -3.0dB on 0.100s off 0.100s
Holding Tone 440 + 480Hz -18.0dB on 0.500s off 0.500s
350 + 440Hz -18.0dB on 0.500s off 2.500s
Warning Tone 1400Hz -18.0dB on 0.500s off continuous
Confirmation Tone 3x( 350 + 440Hz -18.0dB on 0.100s off 0.100s )

The following table describes the labels in this screen.

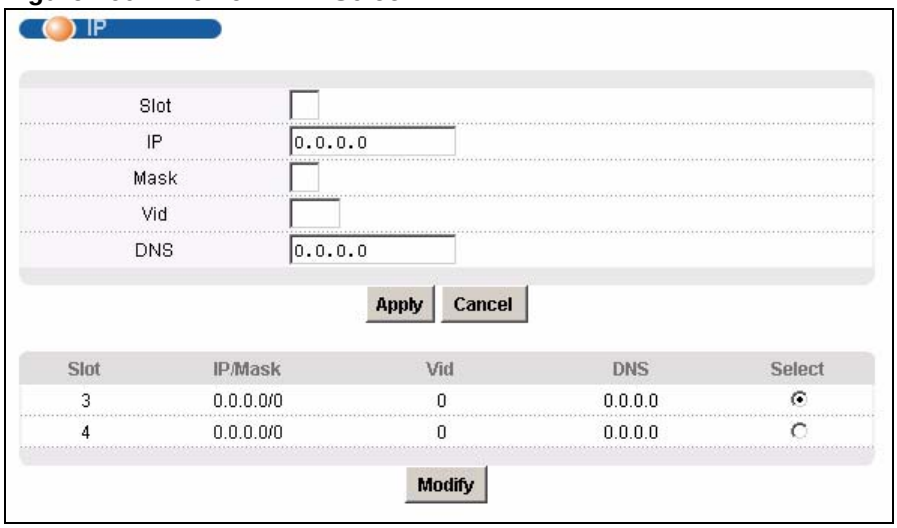
**Table 209** The VoIP > Countrycode > Detail Screen

| LABEL | DESCRIPTION |
|---|---|
| UP | Click this to return to the **VoIP** > **Countrycode** screen. |
| Pulse Parameters | This section displays region-specific information about pulse dialling. |
| Flash Min / Max (ms) | These display the minimum and maximum hook flash times. |
| Break Min / Max (ms) | These display the minimum and maximum times for ending a pulse. |
| Make Min / Max (ms) | These display the minimum and maximum times for beginning a pulse. |
| Inter-Digit Min (ms) | This displays the minimum waiting time between pulsed digits. |
| Meter Parameters | This section displays region-specific information about call metering. |
| Frequency (kHz) | This displays the frequency of the call-metering tone (in kilohertz). |
| On Time (ms) | This displays the duration of the call-metering tone (in milliseconds). |
| Off Time (ms) | This displays the time between call-metering tones (in milliseconds). |
| Tones Parameters | This section displays region-specific information about call progress tones. |
| Congestion Tone | This is the tone sent to indicate that the network is busy. |
| Special Dial Tone | This is the tone sent to indicate that certain three-way calling, conference and call transfer services are available. |
| Call Waiting Tone #2 | This is reserved for future use. |
| Howler Tone | This is the tone sent to indicate that the handset has been left off-hook too long. |
| Holding Tone | This is the tone sent to indicate that the call has been put on hold. |
| Warning Tone | This is the tone sent to indicate that the telephone circuit is operating abnormally. |
| Confirmation Tone | This is the tone sent to indicate that user-entered information has been successfully received. |

## 17.6 The VoIP IP Screen

Use this screen to specify the IP address, subnet mask, VLAN ID and DNS information for each of the VoIP line cards managed by the IES. Click **VoIP** > **IP**. The following screen displays.

**Figure 260** The VoIP > IP Screen




The following table describes the labels in this screen.

**Table 210** The VoIP > IP Screen

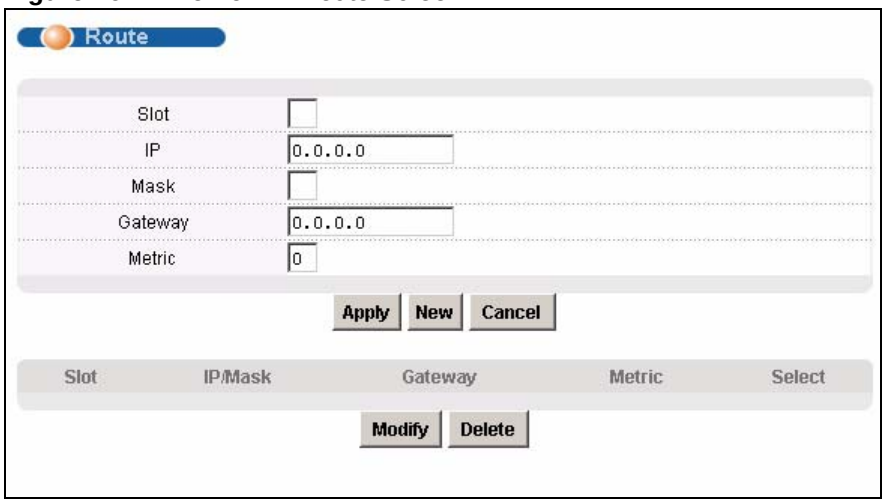
| LABEL | DESCRIPTION |
|---|---|
| Slot | Enter the slot number of the line card you want to configure. |
| IP | Enter the IP address the line card uses for VoIP communications.<br>Enter the IP address in dotted decimal notation. For example, 192.168.1.100. |
| Mask | Enter the number of bits in the VoIP line card's subnet mask. |
| Vid | Enter the number of the VLAN that this static VoIP line card is to use. |
| DNS | Enter the DNS server's IP address for this VoIP line card. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click this to start configuring the screen again. |
| Slot | This displays a VoIP line card's slot number. |
| IP Mask | This displays a VoIP line card's IP address, if one is configured (if an IP address is not configured, **0.0.0.0** displays). |
| Vid | This displays a VoIP line card's VLAN ID, if one is configured (if a VLAN ID is not configured, **0** displays). |
| DNS | This displays a VoIP line card's DNS server IP address, if configured (if a DNS server IP address is not configured, **0.0.0.0** displays). |
| Select | Select the line card you wish to modify. |
| Modify | Select a line card and click this in order to edit its configuration. |

# 17.7 The VoIP Route Screen

Use this screen to set up and maintain routing for the VoIP line cards. The routing table contains entries that, based on the line card slot number and destination IP address or subnet, determine where the system forwards packets from the line cards.

Click **VoIP** > **Route**. The following screen displays.

**Figure 261** The VoIP > Route Screen




The following table describes the labels in this screen.

**Table 211** The VoIP > Route Screen

| LABEL | DESCRIPTION |
|---|---|
| Slot | Enter the slot number of the line card for which you wish to configure this rule. |
| IP<br>Mask | Enter the IP address and the number of bits in the subnet mask that define the range of IP addresses to which this entry applies. If the destination IP address of a packet is in this range, the system forwards the frame to the specified gateway. |
| Gateway | Enter the IP address to which the system forwards frames if the destination IP address of a packet is in the specified range. |
| Metric | The metric represents the “cost” of transmission for routing purposes. IP routing uses hop count as the measurement of cost, with a minimum of 1 for directly-connected networks. Select the number that approximates the cost for this link The number need not be precise, but it must be between 1 and 15. In practice, 2 or 3 is usually a good number.<br>If two entries for the same line card have the same metric, the system uses the one with the lower IP address. |
| Apply | Click **Apply** to save the changes in this screen to the system’s volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Slot | This displays an entry’s line card slot number. |

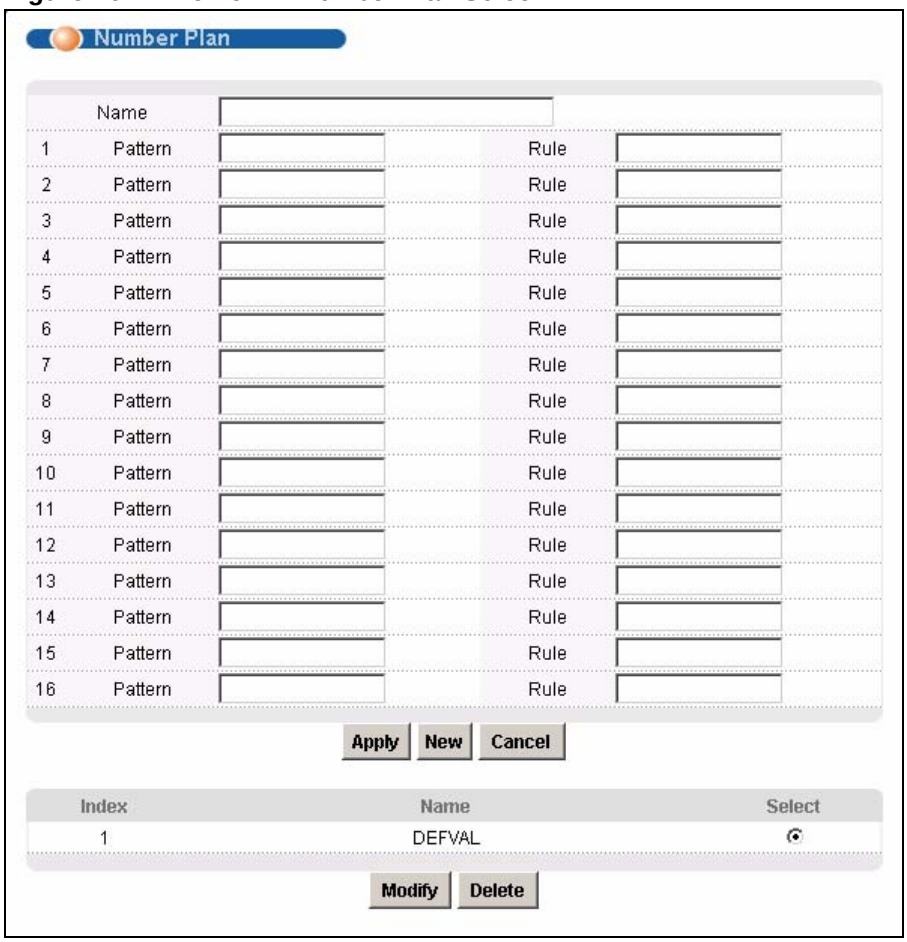
**Table 211** The VoIP > Route Screen

| LABEL | DESCRIPTION |
|---|---|
| IP/Mask | This displays an entry's IP address and subnet mask, defining the range of IP addresses to which this entry applies. |
| Gateway | This displays an entry's gateway IP address, to which frames fitting the **Slot** and **IP/Mask** parameters are forwarded. |
| Metric | This displays an entry's metric value. |
| Select | Select the entry you wish to modify or delete. |
| Modify | Select an entry profile and click this in order to edit its configuration. |
| Delete | Select a H.248 profile and click this to delete the profile. Once deleted, information cannot be retrieved. |

## 17.8 The Number Plan Screen

Number plans are used by the system to identify specific types of phone numbers dialed by a user, and to process the number before transmission by deleting, replacing or adding digits according to the relevant rule. Click **VoIP** > **Number Plan**. The following screen displays.

**Figure 262** The VoIP > Number Plan Screen



The following table describes the labels in this screen.

**Table 212** The VoIP > Number Plan Screen

| LABEL | DESCRIPTION |
|---|---|
| Name | Enter the name of the number plan table. If you are configuring a new number plan table, you can enter the name of the new table here. If you are looking an existing number plan table, this field is not editable. |
| 1~16 | This is the pattern / rule number. When the system checks a dialed number against the table, it checks the patterns in numerical order from 1 ~ 16, so ordering is important. |
| Pattern | This is the dialed number for which this table entry applies.<br>Allowed characters are:<br>• Numerals “0” ~ “9”<br>• “x” (representing one digit)<br>• Asterisk “*” (representing one or more digits)<br>• Period “.” (representing zero or more repetitions of the digit or range preceding it, for example “5.” and “[1~3].”).<br>• Tilde “~” (representing a range of digits, for example “[3~9]”). The tilde must be used in brackets, and characters to either side of the tilde must both be digits.<br>• Comma”,” (representing a choice of digits. for example “[4,9]”). The comma must be used in brackets, and characters to either side of the comma must both be digits.<br>• Pipe “|”, seperating number plan patterns.<br>• Brackets “[“ and “]” (representing an allowed range, for example “[1,3~5]”).<br>• A maximum of one pair of parentheses “(” and “)”<br>For example, if a **Pattern String** entry is “0021*”, the corresponding **Rule String** is applied to any dialed number starting from “0021”. |
| Rule | This is the rule applied to the corresponding **Pattern String**.<br>Allowed characters are:<br>• “\c” = the **Pattern String** is replaced by the countrycode (specified in the relevant call service profile).<br>• “\d” = the **Pattern String** is replaced by the national destination (region) code (specified in the relevant call service profile).<br>• “\1” = the **Pattern String** is replaced by the numbers enclosed by the parentheses “(” and “)” in the **Pattern String**<br>• “deny” = the **Pattern String** is not allowed.<br>For example:<br>• If the Pattern String is “00244(*)”, the Rule String is “\c\1” and the country code in the relevant call service profile is “28”, the dialed number “00244123456” becomes “28123456”.<br>• If the Pattern String is “010(*)”, the Rule String is “\d\1” and the national destination code in the relevant call service profile is “01473”, the dialed number “010456789” becomes “01473456789”.<br>• If the Pattern String is “0440(1*)” and the Rule String is “\1”, the dialed number “04401473987654” becomes “1473987654”. |
| Apply | Click **Apply** to save the changes in this screen to the system’s volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a number plan table, you can click **New** to start configuring a fresh table without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Index | This is an incremental number indicating the order in which the number plan tables were created. |
| Name | These are the names of individual tables. The DEFVAL table always exists, and is assigned to all ports by default. |

**Table 212** The VoIP > Number Plan Screen

| LABEL | DESCRIPTION |
|---|---|
| Select | Select the number plan table you wish to modify or delete. |
| Modify | Select a number plan table and click this in order to edit its configuration. |
| Delete | Select a number plan table and click this to delete the profile. Once deleted, information cannot be retrieved. |

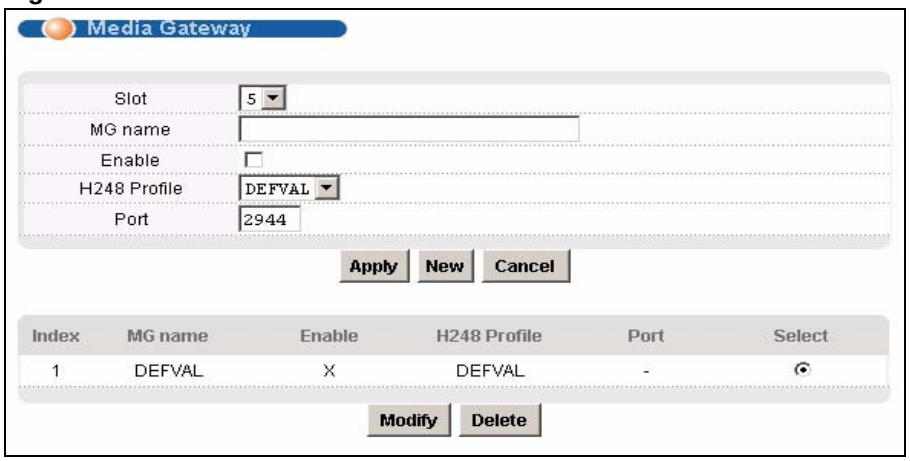
## 17.9 The VoIP H248 Screen

Use this screen to define media gateways (MGs) on the system's H.248 VoIP cards.

Use multiple media gateways to allow different H.248 VoIP line cards, and different physical ports on a single line card, to associate with different H.248 media gateway controllers. Each H.248 VoIP line card supports up to five media gateways (including the default gateway "DEFVAL", which cannot be disabled, modified or deleted). Assign H.248 profiles to a line card's individual ports in the **Port** > **VoIP H248** screen.

Click **VoIP** > **VoIP H248**. The following screen displays.

**Figure 263** The VoIP > H248 Screen




The following table describes the labels in this screen.

**Table 213** The VoIP > H248 Screen

| LABEL | DESCRIPTION |
|---|---|
| Slot | Select the slot number of the line card you want to configure. |
| MG List<br>Load | If you want to edit an existing media gateway, select it from the **MG list** and click **Load**. |
| MG Name | Enter a name for the media gateway (up to 31 ASCII characters; spaces are not allowed). |
| Enable | Select this to activate the media gateway. |
| H248 Profile | Select the H.248 profile this media gateway is to use. The H.248 profile defines the media gateway controller(s) associated with this media gateway. Define H.248 profiles in the **Profile** > **VoIP H248** screen. |
| Port | Enter a port number for this media gateway. Each media gateway on a line card must use a different port. The default is port 2944. |

**Table 213** The VoIP > H248 Screen

| LABEL | DESCRIPTION |
|---|---|
| New | While you are modifying a profile, you can click this to start configuring a fresh table without saving your changes. |
| Delete | Select a profile, click **Load**, then click this to delete the profile. Once deleted, information cannot be retrieved. |
| Cancel | Click this to start configuring the screen again. |
| Apply | Click this to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Index | This is an incremental number indicating the order in which the number plan tables were created. |
| MG Name | This is the name of the media gateway. |
| Enable | This displays **X** if the media gateway is activated, and **V** if the profile is not activated. |
| H248 Profile | This displays the name of the H.248 profile the media gateway uses. |
| Port | This displays the number of the port the media gateway uses. |
| Select | Select the entry you wish to modify or delete. |
| Modify | Select an entry and click this in order to edit its configuration. |
| Delete | Select an entry and click this to delete it. Once deleted, information cannot be retrieved. |

## 17.10 The Local Help Screen

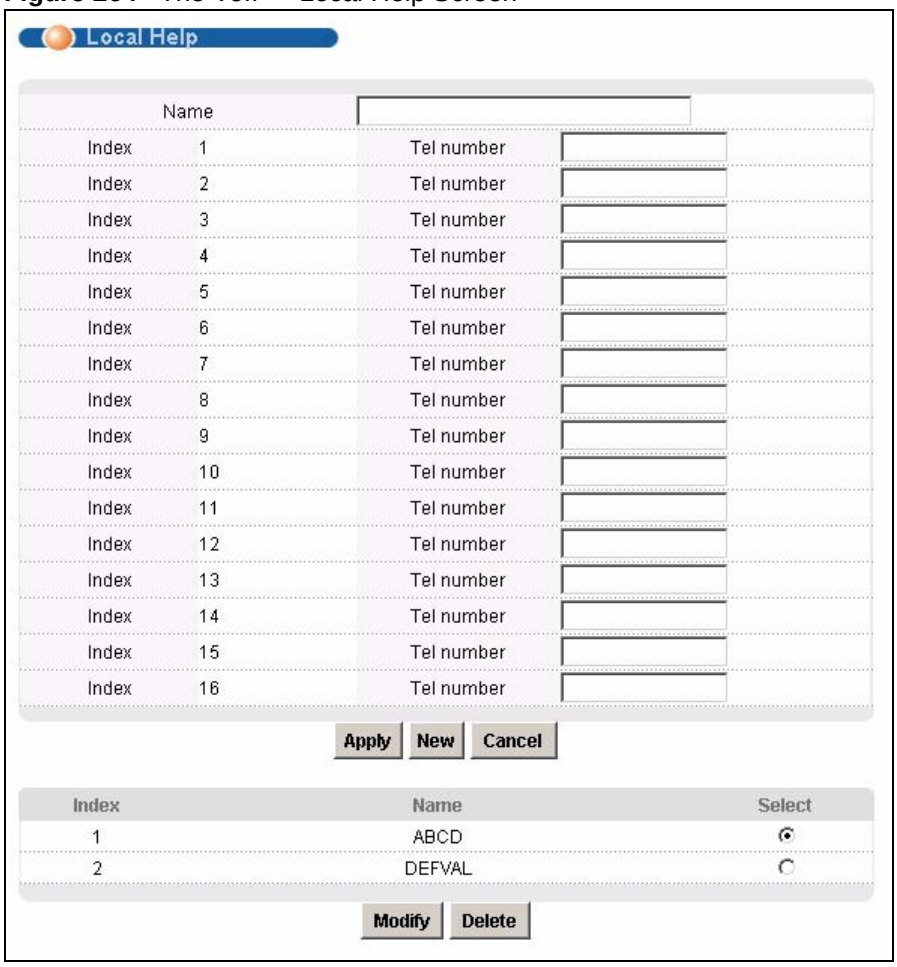
The local help feature allows subscribers on the VoIP line card(s) to place calls to other, specified extensions when the system's connection to the regular service provider is not available.

You can use this feature to provide an alternative to emergency calls. For example, if users cannot call 911 (in order to reach an emergency dispatcher at a public safety answering point) you can route 911 calls to a company medical office or security guardhouse. When a user dials the number, the first number in the corresponding table rings. If the call is not answered, the second number in the table rings, and so on.

To use this feature, you must also configure the **Profile** > **VoIP SIP CALLSVC** screen.

Click **VoIP** > **Local Help**. The following screen displays.

**Figure 264** The VoIP > Local Help Screen




The following table describes the labels in this screen.

**Table 214** The VoIP > Local Help Screen

| LABEL | DESCRIPTION |
|---|---|
| Name | Enter a name for this local help profile (up to 31 ASCII characters; spaces are not allowed). |
| Index 1~16 | This is the local help phone number index. |
| Tel Number | Enter the telephone number of an extension on any of the VoIP line cards in the system that other extensions should be able to call in the event that the connection to the service provider is not available. |
| Apply | Click this to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click this to start configuring a fresh table without saving your changes. |
| Cancel | Click this to start configuring the screen again. |
| Index | This is the local help table index. |
| Name | These are the names of individual local help tables. |
| Select | Select the local help table you wish to modify or delete. |

**Table 214** The VoIP > Local Help Screen

| LABEL | DESCRIPTION |
|---|---|
| Modify | Select a local help table and click this in order to edit its configuration. |
| Delete | Select a local help table and click this to delete the profile. Once deleted, information cannot be retrieved. |

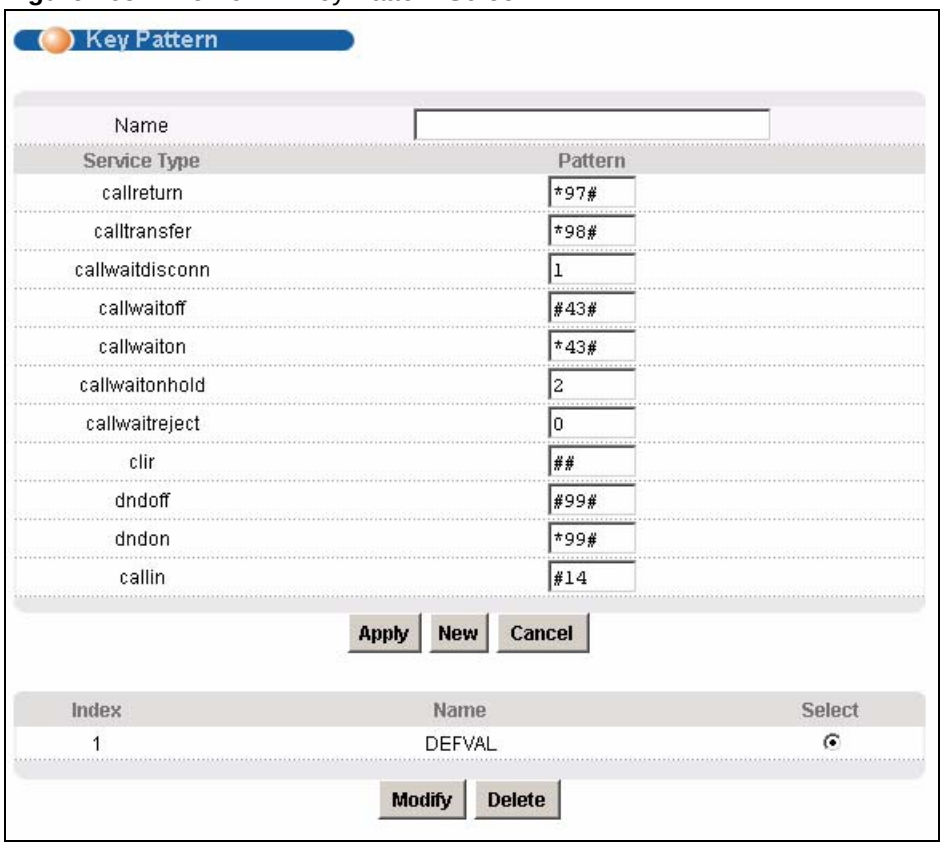
## 17.11 The VoIP Key Pattern Screen

Use this screen to configure key pattern profiles. A key pattern profile is a set of telephone key-presses that allow users to access a variety of features such as call hold, call transfer, and so on.

Before a user can access a feature, you must enable it in the SIP call service profile (use the **Profile** > **VoIP SIP CALLSVC** screen).

Click **VoIP** > **Key Pattern**. The following screen displays.

**Figure 265** The VoIP > Key Pattern Screen.



The following table describes the labels in this screen.

**Table 215** The VoIP > Key Pattern Screen

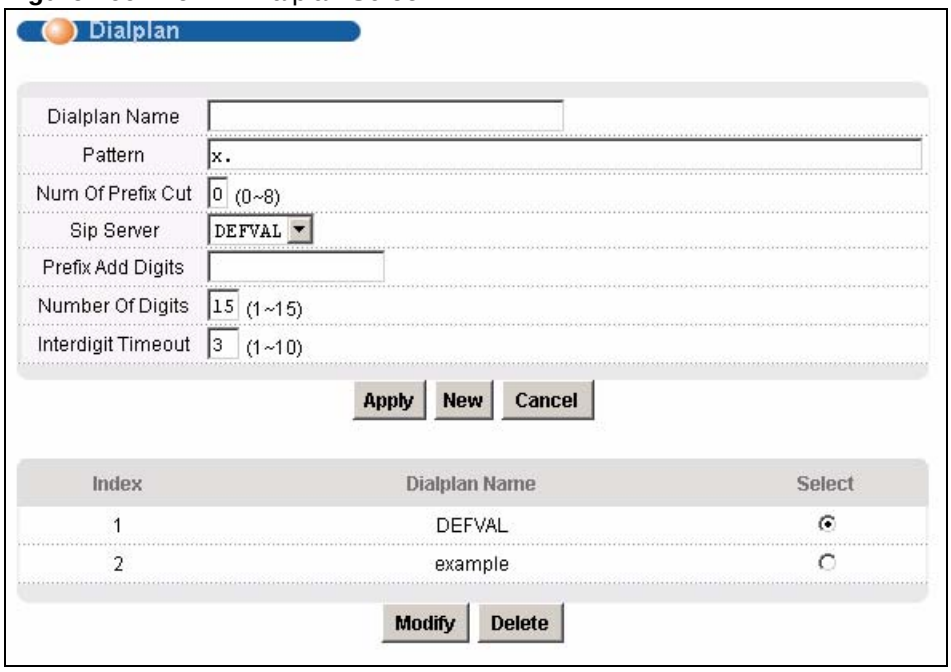
| LABEL | DESCRIPTION |
|---|---|
| Name | Enter a name for this key pattern profile (up to 31 ASCII characters; spaces are not allowed). |
| Service Type | These fields control the telephone keys a user presses to access a particular service. Characters are limited to the numerals 0~9, the pound (#) and asterisk (*). |
| callreturn | Enter the sequence of keys the user presses to dial the last number to call the user (1~7 characters). |
| calltransfer | Enter the sequence of keys the user presses to enable a call transfer (1~7 characters). |
| callwaitdisconn | Enter the key the user presses to disconnect a current call and accept a waiting call (one character only). |
| callwaitoff | Enter the sequence of keys the user presses to turn call waiting off (1~7 characters). |
| callwaiton | Enter the sequence of keys the user presses to enable call waiting (1~7 characters). |
| callwaitonhold | Enter the key the user presses to place a current call on hold and accept a waiting call (one character only). |
| callwaitreject | Enter the key the user presses to reject a waiting call (one character only). |
| clir | Enter the sequence of keys the user presses to restrict his/her phone number by not sending caller ID information (1~7 characters). |
| dndoff | Enter the sequence of keys the user presses to turn off Do Not Disturb (1~7 characters). |
| dndon | Enter the sequence of keys the user presses to turn on Do Not Disturb (1~7 characters). |
| callin | Enter the sequence of keys the user presses to turn on the Call In feature. When the Call In feature is active, the system limits call ringing time to ten seconds. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a profile, you can click **New** to start configuring a fresh profile without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Index | This is an incremental number indicating the order in which the profiles were created. |
| Name | This is the name of the profile. |
| Select | Select the profile you wish to modify or delete. |
| Modify | Select a profile and click this to edit its configuration. |
| Delete | Select a profile and click this to delete the profile. Once deleted, information cannot be retrieved. |

## 17.12 Dialplan Screen

The system uses dial plans to identify specific types of phone numbers dialed by a user, and to process the number before transmission by deleting or adding digits according to the relevant rule. The dial plan can also forward the call to a specific SIP server. Use a dial plan profile to collect a group of dial plans into a profile. Then assign the dial plan profile to a port to apply all of the dial plans included in the profile.

Click **VoIP** > **Dialplan** to open the following screen. Use this screen to configure individual dial plans.

**Figure 266** VoIP > Dialplan Screen




The following table describes the labels in this screen.

**Table 216** VoIP > Dialplan Screen

| LABEL | DESCRIPTION |
|---|---|
| Dialplan Name | Enter the name of the dialplan. If you are configuring a new dialplan, you can enter the name. If you are editing an existing dialplan, this field is not editable. |
| Pattern | This is the dialed number to which this table entry applies.<br>Allowed characters are:<br>• Numerals “0” ~ “9”<br>• Asterisks “*”<br>• A maximum of one pair of parentheses “(” and “)”<br>For example, if a **Pattern String** entry is “0021*”, the corresponding **Rule** is applied to any dialed number starting from “00210” to “00219”. |
| Num of Prefix Cut | Select how many digits to remove from the dialed number. For example, enter 1 to have the system remove the first digit of the dialed number. |
| SIP Server | Select the SIP server to which the system sends calls that match this dialplan. |
| Prefix Add Digits | Enter digits to add to the beginning of the dialed callee number. |

**Table 216** VoIP > Dialplan Screen

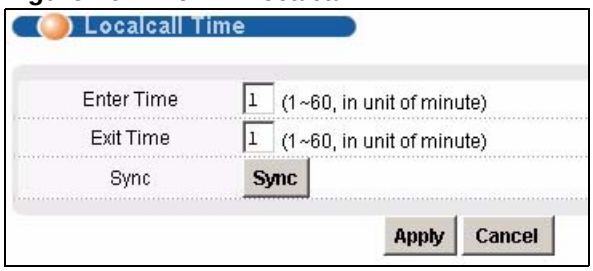
| LABEL | DESCRIPTION |
|---|---|
| Number Of Digits | Enter the maximum number of digits of the dialed callee number. Once a caller dials this number of digits, the system processes the call. It does not wait for or accept any further digits. |
| Interdigit Timeout | Enter the maximum number of seconds the system waits for each digit input of a complete callee number after you press the flash key on the phone. If the system does not receive the next digit entered within this time period, the system processes digits the caller has dialed. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| New | While you are modifying a number plan table, you can click **New** to start configuring a fresh table without saving your changes. |
| Cancel | Click **Cancel** to start configuring the screen again. |
| Index | This is an incremental number indicating the order in which the dialplans were created. |
| Dialplan Name | These are the names of individual tables. The DEFVAL table always exists, and is assigned to all ports by default. |
| Select | Select an entry you wish to modify or delete. |
| Modify | Select an entry and click this in order to edit its configuration. |
| Delete | Select an entry and click this to delete the profile. Once deleted, information cannot be retrieved. |

## 17.13 The Localcall Screen

The local call feature allows subscribers to call other subscribers if the system cannot connect to the SIP server.

Click **VoIP** > **Localcall** to open the following screen. Use this screen to configure the system's local call settings.

**Figure 267** VoIP > Localcall



The following table describes the labels in this screen.

**Table 217** VoIP > Localcall

| LABEL | DESCRIPTION |
|---|---|
| Enter Time | Set how long the system should wait after losing the connection to the SIP server before using the local call feature. |
| Exit Time | Set how long the system should wait after regaining the connection to the SIP server before it stops using the local call feature. |
| Sync | Click **Sync** to update the VOP cards with the MSC's latest VOP card IP address, port number, and telephone number settings. |
| Apply | Click **Apply** to save the changes in this screen to the system's volatile memory. The system loses these changes if it is turned off or loses power, so use the **Config Save** on the navigation panel and then the **Save** button to save your changes to the non-volatile memory when you are done configuring. |
| Cancel | Click **Cancel** to start configuring the screen again. |

# 18

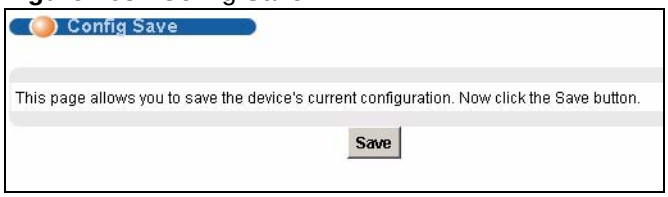
# Config Save

Use this section to save changes to your system's configuration.

## 18.1 The Config Save Screen

Use this screen to save all configuration changes on to your MSC1000G's flash memory. If you do not use this screen, any changes you have made to the system's configuration will be lost once the MSC1000G is shut down.

**Figure 268** Config Save




The following table describes the labels in this screen.

**Table 218** Config Save

| LABEL | DESCRIPTION |
|---|---|
| Save | Click **Save** to save your changes to non-volatile memory when you are done configuring. Otherwise system configuration changes will be lost if the MSC1000G is turned off or loses power. |

# PART III
# Commands

Commands (439)
acl Commands (443)
alarm Commands (471)
clear Commands (479)
cluster Commands (481)
config Commands (487)
diagnostic Commands (489)
ip Commands (499)
lcman Commands (505)
multicast Commands (509)
port Commands (525)
profile Commands (585)
show Commands (637)
switch Commands (675)
sys Commands (711)
vlan Commands (735)
voip Commands (739)
Firmware and Configuration File Maintenance (759)

# 19

# Commands

This chapter introduces the Command Line Interface (CLI) and lists the available commands.

See the web configurator chapters of this User's Guide for background information on features configurable by web configurator.

## 19.1 Commands Introduction

You can use commands to configure the IES.

Telnet to the IES or connect a computer to the console port on the MSC1000G and use terminal emulation software configured to VT100 terminal emulation, 9600 bps, No parity, 8 data bits, 1 stop bit, and no flow control.

The default user name is "admin" and the default password is "1234".

```
User name: admin

Password: ****
Copyright (c) 1994 - 2008 ZyXEL Communications Corp.
```

## 19.2 Command Conventions

The rules of the commands are listed next.

1. The command keywords are in `courier new` font.
2. A command can be abbreviated to the smallest unique string that differentiates it from other commands. For example the `sys date show` command could be abbreviated to `sy d sh`.
3. The optional fields in a command are enclosed in square brackets [], for instance, config [save] means that the save field is optional.
4. "Command" refers to a command used in the command line interface.
5. The | symbol means "or".

Using commands not documented in the user's guide can damage the unit and possibly render it unusable.

## 19.3 Getting Help

The system includes a help facility to provide you with the following information about the commands:

- List of available commands under a command group.
- Detailed descriptions of the commands.

### 19.3.1 List of Available Commands

Enter "`help`" or "`?`" to display a list of commands you can use.

```
ras> help
acl             alarm           chsh            clear
cluster         config          diagnostic      engshcmd
exit            ip              lcman           multicast
oamtest         port            profile         show
switch          sys             vlan            voip
```

```
ras> switch ?
bandwidth       bcastctrl       cfm             dot3ad
garptimer       isolation       mac             mstp
port            qschedule       queuemap
```

### 19.3.2 Detailed Command Information

Enter a command followed by "`help`" or "`?`" to display detailed sub commands and parameters.

```
ras> switch port speed ?
usage: speed <giga-port> <speed>
  <giga-port> : enet1|enet2|all if trunking is disabled
                t1 if trunking is enabled
  <speed>     : auto|1000F|100F|100H
```

## 19.4 Common Command Notation

The following table describes commonly used command parameter notation.

**Table 219** Common Command Notation

| NOTATION | DESCRIPTION |
|---|---|
| […] | The optional fields in a command are enclosed in square brackets [], for instance, `ip ping <ip-address> [<count>]` means that the count field is optional. |
| \| | The \| symbol means “or”. |
| sub1 | This represents subtending port 1. On the MSC’s front panel this is SFP slot 1. |
| sub2 | This represents subtending port 2. On the MSC’s front panel this is SFP slot 2. |
| up1 | This represents uplink port 1. On the MSC’s front panel this is Gigabit interface 3 (a Gigabit Ethernet port/SFP slot pair). |
| up2 | This represents uplink port 2. On the MSC’s front panel this is Gigabit interface 4 (a Gigabit Ethernet port/SFP slot pair). |
| enet1 | This represents Gigabit Ethernet port 1. On the MSC’s front panel, this is Gigabit interface 1 (a Gigabit Ethernet port/SFP slot pair). |
| enet2 | This represents Gigabit Ethernet port 2. On the MSC’s front panel, this is Gigabit interface 2 (a Gigabit Ethernet port/SFP slot pair). |
| *etype*: | Ethernet type in hexadecimal. |
| *t1* | This is the trunk group name. |
| *giga-port* | This represents the Gigabit Ethernet uplink port(s) or subtending port(s) or both. Choose sub1\|sub2\|up1\|up2 if trunking is disabled, tsub\|tup if trunking is enabled. |
| *index* | This is an integer that sets the index number of a table entry. The range starts at 1. The end of the range varies by command. |
| *ip-address* | This represents a valid IP version four address in dotted decimal notation. 192.168.1.1 is an example. |
| *mac* | This represents a MAC address in "a0:c5:12:34:56:78" format. |
| *mux* | The encapsulation method. Choose either llc or vcmux. |
| *mg-name* | The media gateway name. Set this using profile voip h248. |
| *netmask* | This represents the bit number of the subnet mask of an IP address. The range is 0 to 32.<br>To find the bit number, convert the subnet mask to binary and add all of the 1’s together. Take “255.255.255.0” for example. 255 converts to eight 1’s in binary. There are three 255’s, so add three eights together and you get the bit number (24). |
| *port* | This represents the UDP or TCP port number of a service. |
| *priority* | The VLAN priority setting (0~7). |
| *slot* | This represents the number of an individual chassis slot where a line card is located. |
| *slot-port* | This represents the number of an individual chassis slot where a line card is located and the number of a port(s). You can specify a single port <1>, all ports <*> or a list of ports <1,3,4>. You can also include a range of ports <1,5,6~10,11,12>. |
| *pvid, vid* | This represents a VLAN identifier (VLAN ID). The range is [1.. 4094]. |
| *vpi/vci* | The VPI (Virtual Path Indicator) and VCI (Virtual Channel Indicator) of an individual PVC (Permanent Virtual Circuit). The VPI setting can be 0 to 255. The VCI setting can be 32 to 65535 if the VPI is 0 or 1 to 65535 if the VPI is not 0. |

## 19.5 Command Privilege Levels

There is a high, medium or low privilege level for each command.

High privilege commands are only available to administrators with high privilege access. High privilege commands include things like creating administrator accounts, restarting the system and resetting the factory defaults. Administrators with high privilege access can use all commands including the lower privilege commands.

Administrators with middle privilege access can use middle or low privilege commands. Middle privilege commands include things like general feature configuration.

Administrators with the low privilege level are restricted to using only low privilege commands. Low privilege commands are read only and consist of displaying feature settings or configuration.

## 19.6 Saving Your Configuration

Use the following command to save your configuration when you are done with a configuration session.

```
ras> config save
```

Do not turn off your MSC1000G while saving your configuration.

This command saves all system configurations to nonvolatile memory. You must use this command to save any configuration changes that you make, otherwise the MSC1000G returns to its last saved settings when it is restarted. Save your changes after each configuration session.

Nonvolatile memory refers to the MSC1000G's storage that remains even if the MSC1000G's power is turned off. Configuration changes saved in the volatile (run time) memory are lost when the MSC1000G is turned off.

## 19.7 Commands Summary

The following tables list the commands that you can use with the MSC1000G. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

# 20

# acl Commands

This chapter describes the Access Control List management commands.

## 20.1 acl Commands Summary

The following table lists the `acl` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 220** acl Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `acl` | `antimacspoof` | `disable` | | Disables anti-MAC spoofing. Anti-MAC spoofing is a service which detects hosts with fake or duplicated MAC addresses which attempt to access your system. | M |
| | | `enable` | | Enables anti-MAC spoofing. | M |
| | | `show` | | Displays anti-MAC spoofing settings. | L |
| | `dhcprelay82` | `clearinfo` | `<vid>` | Removes option 82 information for the specified VLAN. | M |
| | | `delete` | `<vid>` | Deletes the option 82 information entry for the specified VLAN. | M |
| | | `disable` | `<vid>` | Deactivates option 82 for the specified VLAN. | M |
| | | `enable` | `<vid> <mode>` | Enables option 82 information for the specified VLAN.<br>*mode*: 1 or 2<br>1: Enable DHCP relay and option82.<br>2: Disable DHCP relay but enable option82. | M |
| | | `info` | `<vid> <string>` | Sets information for the option 82 Circuit ID field.<br>*string*: Add descriptive information to appear in the option 82 field (<23 characters). | M |

**Table 220** acl Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | relaymode | <*vid*> [auto\|both] | Sets which DHCP relay mode the system uses for the specified VLAN.<br>auto: send the requests to the active DHCP server first. If the active DHCP server does not respond, the switch sends the DHCP request to the backup DHCP server.<br>both: send the requests to both the active and backup DHCP servers. | M |
| | | optionmode | <*vid*> private\|tr101 [vid on\|off] | Selects the method (Private or TR-101) in which DHCP relay information is sent and whether or not the VLAN ID is transmitted within the packet on the specified VLAN. The vid on\|off option applies to the TR-101 mode only. | M |
| | | server | active <*vid*> <1\|2> | Sets the active DHCP server to which the DHCP requests are sent first.<br>1: Sets the first DHCP server as the active server.<br>2: Sets the second DHCP server as the active server. | M |
| | | | set <*vid*> <*serverip1*> [*serverip2*] | Sets an entry for forwarding DHCP requests to the DHCP servers.<br>*serverip1*, *serverip2*: The IP addresses of the DHCP servers. | M |
| | | | delete <*vid*> [*serverip*] | Removes an entry for forwarding DHCP requests to the DHCP server.<br>*serverip*: The IP address of the DHCP server. | M |
| | | set | <*vid*> | Creates an option 82 entry for the VLAN. | M |
| | | show | | Displays DHCP relay and option 82 settings. | L |
| | | suboption2 | enable <*vid*> | Turns on option 82 sub-option 2. | M |
| | | | disable <*vid*> | Turns off option 82 sub-option 2. | M |
| | | | set <*vid*> <*info*> | Adds the specified information for sub-option 2.<br>*info*: The option 82 information set using the DHCPrelay82 info command. | M |
| | dhcpsnoop | disable | <*slot-port*> | Deactivates DHCP snooping on the specified subscriber port(s). | M |

**Table 220** acl Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | enable | <*slot-port*> | Activates DHCP snooping on the specified subscriber port(s).<br>DHCP snooping allows the system to identify and block packets from devices using unknown/static IP addresses. | M |
| | | flush | <*slot-port*> | Clears the DHCP snooping table on the specified port(s). | M |
| | | pool | delete <*slot-port*> <*ip-address*> | Removes the static IP address from the DHCP snooping table. | M |
| | | | set <*slot-port*> <*ip-address*> | Adds a static IP address to the DHCP snooping table. You can add up to 3 static IP addresses per port. | M |
| | | show | <*slot*>\|<*slot-port*> | Displays the DHCP snooping table on the specified port. | L |
| | dot1x | disable | | Turns off IEEE 802.1x authentication. | M |
| | | enable | | Turns on IEEE 802.1x. | M |
| | | port | control <*slot-port*> auto\|auth\|unauth | Sets the IEEE 802.1x port authentication option for specific subscriber ports.<br>auto: authentication required<br>auth: forced authentication<br>unauth: forced no authentication | M |
| | | | disable <*slot-port*> | Turns off IEEE 802.1x for specific subscriber ports. | M |
| | | | enable <*slot-port*> | Turns on IEEE 802.1x for specific subscriber ports. | M |
| | | | period <*slot-port*> <secs> | Sets the IEEE 802.1x re-authentication period (60~65535) for specific subscriber ports. | M |
| | | | reauth <*slot-port*> on\|off | Enables/disables the IEEE 802.1x re-authentication option for specific subscriber ports. | M |
| | | | show <*slot*> | Displays IEEE 802.1x settings. | L |
| | | radius | ip <*index*> <*ip-address*> | Sets the IP address of the specified external RADIUS server (1 or 2).<br>*index*: The RADIUS server number. | M |
| | | | port <*index*> <*port*> | Sets the external RADIUS server port number of the specified RADIUS server.<br>*index*: The RADIUS server number. | M |

**Table 220** acl Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | | `secret <index> <secret_key>` | Sets the authentication and encryption key of the specified RADIUS server.<br>*index*: The RADIUS server number.<br>*secret_key*: The authentication encryption key (<=31 characters). | M |
| | | `show` | | Displays the external RADIUS server settings. | L |
| | `dscp` | `disable` | `<slot-port>` | Stops the DSCP (Differentiated Services Code Point) service on the specified slot and port.<br>DSCP is a field in the header of IP packets for packet classification purposes. QoS (Quality-of-Service) uses DSCP to provide different level of services and priorities. See Section 20.7 on page 458 for more information. | M |
| | | `enable` | `<slot-port>` | Enables DSCP service on the specified slot and port. | M |
| | | `set` | `<codepoint> <priority>` | Sets DSCP settings.<br>*codepoint*: Each number of codepoints represents a level of service (0~63).<br>*priority*: 0~7 (0 is the lowest priority level and 7 is the highest) | M |
| | | `show` | `[slot]` | Displays global DSCP settings or for the specified slot.<br>*slot*: is between slot 1 and 5 except the MSC1000G slot. | L |
| | `dsbcast` | `enable` | `<slot-port> <vid>` | Turns on the blocking of downstream broadcast packets from going to the specified VLAN on the specified port. | M |
| | | `disable` | `<slot-port> <vid>` | Turns off the blocking of downstream broadcast packets to go to the specified VLAN on the specified port. | M |
| | | `show` | `<slot>\|<slot-port>` | Displays the settings for blocking downstream broadcast packets for the specified slot or port. | M |
| | `maccount` | `disable` | `<slot-port>` | Turns off MAC count limiting on the specified subscriber ports. | M |
| | | `enable` | `<slot-port>` | Turns on MAC count limiting on the specified subscriber ports.<br>MAC count limits the number of MAC addresses that can connect to a subscriber port. | M |
| | | `set` | `<slot-port> <count>` | Sets the MAC count limit number on the specified subscriber ports.<br>*count*: The maximum number of MAC addresses (1~128) | M |

**Table 220** acl Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | show | <*slot*> | Displays MAC count limiting settings. | L |
| | macfilter | delete | <slot-port> <mac> | Removes a MAC filter MAC address entry. | M |
| | | disable | <slot-port> | Turns off the MAC filter on the specified subscriber ports.<br>MAC filter allows only traffic from specified source MAC addresses on the specified subscriber ports. | M |
| | | enable | <*slot-port*> | Turns on the MAC filter on the specified subscriber ports. | M |
| | | mode | <*slot-port*> <accept\|deny> | Sets the MAC filter actions. | M |
| | | set | <*slot-port*> <*mac*> | Adds a MAC filter MAC address entry. | M |
| | | show | <*slot*>\|<*slot-port*> | Displays MAC filter settings. | L |
| | ouifilter | delete | <*slot-port*> <*mac-oui*> | Removes the static MAC OUI filter.<br>MAC OUI (Organization Unit Identifier) filter allows or drops packets with MAC addresses from specific vendors.<br>*mac-oui*: The first three octets of the MAC address. | M |
| | | disable | <*slot-port*> | Deactivates MAC OUI filtering on this port. | M |
| | | enable | <*slot-port*> | Activates MAC OUI filtering on this port. | M |
| | | mode | <*slot-port*> <accept\|deny> | Sets the filter action. | M |
| | | set | <*slot-port*> <*mac-oui*> | Creates a MAC OUI filter.<br>*mac-oui*: The first three octets of the MAC address. | M |
| | | show | <*slot*>\|<*slot-port*> | Displays MAC OUI filter settings for the specified port or slot. | L |
| | pktfilter | set | <*slot-port*> <*type*> | Sets the packet type filter for the specified subscriber ports.<br>Packet type filter allows or drops specified packet types on the specified subscriber ports.<br>*type*: accept-all, pppoe-only, or any combination of ip, arp, dhcp, eapol, pppoe, netbios, igmp separated by a space. | M |
| | | show | <*slot*> | Displays packet type filter settings. | L |
| | pppoeagent | clearinfo | <*vid*> | Resets PPPoE line description for the VLAN. | M |

**Table 220** acl Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | enable | <*vid*> | Enables PPPoE line information for the VLAN. The switch adds the line information to PPPoE packets for identification and security. | M |
| | | delete | <*vid*> | Deletes PPPoE line information settings. | M |
| | | disable | <*vid*> | Deactivates PPPoE line information insertion. | M |
| | | info | <*vid*> <*description*> | Sets PPPoE line information. *description:* Enter a description (up to 24 characters). | M |
| | | optionmode | <*vid*> private\|tr101 [vid on\|off] | Selects the method (Private or TR-101) in which PPPoE line information is encoded in PPPoE discover packets on the specified VLAN, and whether the VLAN ID is transmitted within the packet or not.<br>The vid on\|off option applies to the TR-101 mode only. | M |
| | | set | <*vid*> | Creates a PPPoE agent entry for the VLAN. | M |
| | | show | | Displays PPPoE line information settings. | L |
| | rule | delete | <*slot-port-vpi/vci*> <*profile*> | Removes the ACL profile.<br>Upstream access control rules allows you to apply profiles on the subscriber line PVC. | M |
| | | set | <*slot-port-vpi/vci*> <*profile*> | Applies the ACL profile. You can apply up to 8 profiles to a PVC. | M |
| | | show | <*slot-port-vpi/vci*> | Displays ACL profile settings for a PVC. | L |
| | usbcastctrl | disable | | Disables rate limit for broadcast traffic. | M |
| | | enable | | Enables rate limit for broadcast traffic. | M |
| | | set | <*rate*> | Sets the maximum bandwidth for all upstream broadcast traffic entering the MSC1000G.<br>*rate*: 32~16384 kbps in increments of 32 kbps. | M |
| | | show | | Displays rate limit settings. | L |

## 20.2 acl antimacspoof Commands

Use these commands to configure the Anti-MAC Spoofing feature. Anti-MAC Spoofing is a service which detects hosts with fake or duplicated MAC addresses which attempt to access your system.

### 20.2.1 acl antimacspoof Command

Syntax:

```
acl antimacspoof show
```

This command shows whether the antimacspoof feature is enabled or not.

The following figure shows an example.

```
ras> acl antimacspoof enable
ras> acl antimacspoof show
antimacspoof state: enable
```

## 20.3 acl dhcprelay82 Commands

Use these commands to configure the DHCP relay feature.

### 20.3.1 acl dhcprelay82 clearinfo Command

Syntax:

```
acl dhcprelay82 clearinfo <vid>
```

This command deletes the relay agent information settings.

### 20.3.2 acl dhcprelay82 enable Command

Syntax:

```
acl dhcprelay82 enable <vid> <mode>
```

where

<*vid*> = ID of the VLAN to which this setting applies.

<*mode*> = Sets the relay mode.
1: Activates DHCP relay service and include option 82 information in the client DHCP requests for this VLAN.
2: Disables DHCP relay service but include option 82 information in the client DHCP requests. Before broadcasting, the switch adds option82 information to DHCP requests.

This command enables DHCP relay on a VLAN and sets the relay mode.

The following example creates a configuration entry and enables DHCP relay mode 1 on VLAN 10.

```
ras> acl dhcprelay82 set 10
ras> acl dhcprelay82 enable 10 2
```

### 20.3.3 acl dhcprelay82 info Command

Syntax:

`acl dhcprelay82 info <vid> <string>`

where

| | | |
|---|---|---|
| *<vid>* | = | ID of the VLAN to which this setting applies. |
| *<string>* | = | Up to 23 English keyboard characters of additional information to add to the DHCP client TCP/IP configuration requests that are relayed to a DHCP server. Examples of information you could add would be the name of the system or the ISP. |

This command sets the relay agent information to be included in client DHCP requests before forwarding. A DHCP server implements network information (such as IP address) policies based on the relay agent information.

The following example sets the system to add a string (`test`) to client DHCP request packets before forwarding them to the DHCP server.

```
ras> acl dhcprelay82 info test
```

### 20.3.4 acl dhcprelay82 optionmode Command

Syntax:

`acl dhcprelay82 optionmode <vid> private|tr101 [vid on|off]`

This command selects the method (Private or TR-101) in which DHCP relay information is sent and whether or not the VLAN ID is transmitted within the packet on the specified VLAN. The `vid on|off` option applies to the TR-101 mode only. See Section 5.2 on page 94 for more information on Private and TR-101 modes.

The following example sets the DHCP relay feature on VLAN 10 to use TR-101 encoding, and to transmit the VLAN ID.

```
ras> acl dhcprelay82 optionmode 10 tr101 vid on
```

### 20.3.5 acl dhcprelay82 relaymode Command

Syntax:

`acl dhcprelay82 relaymode <mode>`

where

| | | |
|---|---|---|
| *<mode>* | = | `auto` The system sends the requests to the active DHCP server first. If the active DHCP server does not respond, the switch sends the DHCP request to the backup DHCP server.<br>`both` The system sends the requests to both the active and backup DHCP servers. |

This command sets the DHCP relay mode on the system.

## 20.3.6 acl dhcprelay82 server active Command

Syntax:

`acl dhcprelay82 server active <vid> <active-server>`

where

| | | |
|---|---|---|
| `<active-server>` | = | `1:` Sets the first DHCP server as the active DHCP server. The system sends DHCP requests in the specified VLAN to the first DHCP server first.<br>`2:` Sets the second DHCP server as the active DHCP server. The system sends DHCP requests in the specified VLAN to the second DHCP server first. |

This command specifies the DHCP server to which client DHCP requests are sent first. If you have also configured a second DHCP server, the non-active DHCP server will be the backup DHCP server. This function is applicable when you have configured two DHCP server settings for the VLAN.

The following example sets the system to forward client DHCP requests in VLAN 3 to the second DHCP server first.

```
ras> acl dhcprelay82 server active 3 2
```

## 20.3.7 acl dhcprelay82 server delete Command

Syntax:

`acl dhcprelay82 server delete <vid> [serverip]`

where

| | | |
|---|---|---|
| `<vid>` | = | A VLAN ID to be served with DHCP relay. |
| `<serverip>` | = | The IP address of a DHCP server. |

This command removes a DHCP server setting to which DHCP client requests are forwarded in the specific VLAN.

## 20.3.8 acl dhcprelay82 server set Command

Syntax:

`acl dhcprelay82 server set <vid> <primary-server> [secondary-server]`

where

| | | |
|---|---|---|
| `<vid>` | = | A VLAN ID to be served with DHCP relay.<br>Note: The DHCP server(s) must be in the same VLAN. |
| `<primary-server>` | = | The IP address of the primary DHCP server. |
| `<secondary-server>` | = | The IP address of the secondary DHCP server. |

This command sets an entry for forwarding client DHCP requests received on a specific VLAN to the DHCP server(s) at the specified IP address(es).

The following example sets 192.168.1.10 and 192.168.1.11 as the primary and secondary DHCP servers respectively in VLAN 3.

```
ras> acl dhcprelay82 server set 3 192.168.1.10 192.168.1.11
```

### 20.3.9 acl dhcprelay82 set Command

Syntax:

`acl dhcprelay82 set <vid>`

This command creates a DHCP relay entry for the specified VLAN. After you have created an entry, you can configure DHCP relay and relay option82 settings.

The following figure creates an entry for VLAN 10.

```
ras> acl dhcprelay82 set 10
```

### 20.3.10 acl dhcprelay82 show Command

Syntax:

`acl dhcprelay82 show`

This command displays whether or not the DHCP relay feature is activated, the DHCP server's IP address, the status of the DHCP relay agent info option 82 feature and the information configured for it. It also lists the DHCP relay server entries.

The following figure shows an example. The asterisk (*) in front of a DHCP server address indicates that it is the active DHCP server in the VLAN.

```
ras> acl dhcprelay82 show
dhcp relay status:          disable
dhcp relay mode:            both
dhcp relay option82 info:   [NULL]
server list:
server set: 1
index  vid  primary-server     secondary-server
-----  ----- ----------------- ------------------
    1     3 192.168.1.10      (*)192.168.1.11
ras>
```

## 20.4 DHCP Relay Option 82 (Agent Information) Sub-option 2 (Remote ID)

Use the following commands to configure the DHCP relay Option 82 (agent information) feature, sub-option 2. This feature applies regardless of whether or not the DHCP relay is on.

### 20.4.1 Option 82 Sub-option 2 Enable Command

Syntax:

```
ras> acl dhcprelay82 suboption2 enable <vid>
```

where

| | | |
|---|---|---|
| <vid> | = | The ID of the VLAN to which to apply the setting. |

This command turns on the DHCP relay agent information (Option 82, Sub-option 2) for the specified VLAN.

### 20.4.2 Option 82 Sub-option 2 Disable Command

Syntax:

```
ras> acl dhcprelay82 suboption2 disable <vid>
```

where

| | | |
|---|---|---|
| <*vid*> | = | The ID of the VLAN to which to apply the setting. |

This command turns off the DHCP relay agent information (Option 82, Sub-option 2) for the specified VLAN.

### 20.4.3 Option 82 Sub-option 2 Set Command

Syntax:

```
ras> acl dhcprelay82 suboption2 set <vid> <info>
```

where

| | | |
|---|---|---|
| <*vid*> | = | The ID of the VLAN to which to apply the setting. |
| <*info*> | = | Up to 23 English keyboard characters of additional information for the MSC1000G to add to the DHCP requests that it relays to a DHCP server.<br>Examples of information you could add would be the name of the MSC1000G or the ISP. To clear this field, type a pair of double quotation marks with no space between them (“”). |

This command adds the specified information for the relay agent (Option 82, Sub-option 2) for the specified VLAN.

## 20.5 acl dhcpsnoop Commands

Use these commands to configure or show DHCP snooping settings on the subscriber ports. The switch gets the client MAC-IP address information (in the reply from a DHCP server) and stores it in the DHCP snooping table. The system only forwards packets from the clients whose MAC-IP address is in the DHCP snooping table. Packets from unknown IP address(es) are not forwarded (dropped). This feature prevents subscribers from assigning their own static IP addresses.

## 20.5.1 acl dhcpsnoop disable Command

Syntax:

`acl dhcpsnoop disable <slot-port>`

This command disables the DHCP snooping feature on the specified port(s) on the line card.

## 20.5.2 acl dhcpsnoop enable Command

Syntax:

`acl dhcpsnoop disable <slot-port>`

This command activates the DHCP snooping feature on the specified port(s) on the line card. The following example enables DHCP snooping on port 1 of the line card in slot 3.

```
ras> acl dhcpsnoop enable 3-1
```

## 20.5.3 acl dhcpsnoop flush Command

Syntax:

`acl dhcpsnoop flush <slot-port>`

This command clears the DHCP snooping binding table. The system automatically clears the binding table when you disable DHCP snooping on a port.

## 20.5.4 acl dhcpsnoop pool set Command

Syntax:

`acl dhcpsnoop pool set <slot-port> <ip-address>`

This command adds a static IP address to the DHCP snooping table on a port.

The following example adds two static IP addresses (`192.168.1.10` and `192.168.1.11`) to the DHCP snooping table on port 10 of the line card in slot 2.

```
ras> acl dhcpsnoop pool set 2-10 192.168.1.10
ras> acl dhcpsnoop pool set 2-10 192.168.1.11
ras> acl dhcpsnoop show 2-10
 port enable static ip pool
----- ------ ------------------------------------------------
 2-10   -    192.168.1.10    192.168.1.11
ras>
```

## 20.5.5 acl dhcpsnoop pool delete Command

Syntax:

`acl dhcpsnoop pool delete <slot-port> <ip-address>`

This command removes a static IP address from the DHCP snooping table of a port on the specified line card. The following example removes the static IP address of 192.168.1.11 from the port 10 on the line card in slot 2.

```
ras> acl dhcpsnoop pool delete 2-10 192.168.1.11
ras> acl dhcpsnoop show 2-10
 port enable static ip pool
----- ------ ------------------------------------------------
 2-10   -    192.168.1.10
ras>
```

### 20.5.6 acl dhcpsnoop show Command

Syntax:

`acl dhcpsnoop show <slot>|<slot-port>`

Use this command to display the current static DHCP snooping settings of the port(s) on the line card. The following example displays the settings of port 10 on the line card in slot 2.

```
ras> acl dhcpsnoop show 2-10
 port enable static ip pool
----- ------ ------------------------------------------------
 2-10   -    192.168.1.10    192.168.1.11
ras>
```

## 20.6 acl dot1x Commands

Use these commands to configure the IEEE 802.1x authentication feature.

### 20.6.1 acl dot1x disable Command

Syntax:

`acl dot1x disable`

This command turns off the IEEE 802.1x authentication feature.

### 20.6.2 acl dot1x enable Command

Syntax:

`acl dot1x enable`

This command turns on the IEEE 802.1x authentication feature.

### 20.6.3 acl dot1x port control Command

Syntax:

`acl dot1x port control <slot-port> auto|auth|unauth`

where

| | | |
|---|---|---|
| `auto` | = | Authenticate all subscribers before they can access the network through this port. |
| `auth` | = | Allow all connected users to access the network through this port without authentication. |
| `unauth` | = | Deny all subscribers access to the network through this port. |

This command sets the IEEE 802.1x port authentication option for specific subscriber ports.

## 20.6.4 acl dot1x port disable Command

Syntax:

`acl dot1x port disable <slot-port>`

This command turns off IEEE 802.1x for the specified subscriber ports.

## 20.6.5 acl dot1x port enable Command

Syntax:

`acl dot1x port enable <slot-port>`

This command turns on IEEE 802.1x for the specified subscriber ports.

## 20.6.6 acl dot1x port period Command

Syntax:

`acl dot1x port period <slot-port> <secs>`

where

| | | |
|---|---|---|
| `<secs>` | = | Sets the IEEE 802.1x re-authentication period in seconds (60~65535). |

This command sets the IEEE 802.1x re-authentication period for the specified subscriber ports.

## 20.6.7 acl dot1x port reauth Command

Syntax:

`acl dot1x port reauth <slot-port> on|off`

This command enables or disables the IEEE 802.1x re-authentication option for the specified subscriber ports.

## 20.6.8 acl dot1x port show Command

Syntax:

`acl dot1x port show <slot>`

This command displays the IEEE 802.1x settings of the subscriber ports on the line card in the specified slot.

```
ras> acl dot1x port show 5
port enable control reauth period
---- ------ ------- ------ ------
5- 1   -    auto      V     3600
5- 2   -    auto      V     3600
5- 3   -    auto      V     3600
5- 4   -    auto      V     3600
5- 5   -    auto      V     3600
-------------------------- [snip] --------------------------
5-45   -    auto      V     3600
5-46   -    auto      V     3600
5-47   -    auto      V     3600
5-48   -    auto      V     3600
```

## 20.6.9 acl dot1x radius ip Command

Syntax:

`acl dot1x radius ip <index> <ip-address>`

where

| | | |
|---|---|---|
| *<index>* | = | The index number of an external RADIUS server entry (1 or 2). |
| *<ip-address>* | = | This IP address of the external RADIUS server. |

This command sets the IP address of the specified external RADIUS server.

## 20.6.10 acl dot1x radius port Command

Syntax:

`acl dot1x radius port <index> <port>`

where

| | | |
|---|---|---|
| *<index>* | = | The index number of an external RADIUS server entry (1 or 2). |
| *<port>* | = | The RADIUS server port number. |

This command sets the external RADIUS server port number of the specified RADIUS server.

## 20.6.11 acl dot1x radius secret Command

Syntax:

`acl dot1x radius secret <index> <secret_key>`

where

| | | |
|---|---|---|
| *<index>* | = | The index number of an external RADIUS server entry (1 or 2). |
| *<secret_key>* | = | The authentication and encryption keys of the specified RADIUS server. |

This command sets the authentication and encryption keys of the specified RADIUS server.

### 20.6.12 acl dot1x show Command

Syntax:

```
acl dot1x show
```

This command displays the status of the IEEE 802.1x feature and the external RADIUS server settings.

```
ras> acl dot1 show
dot1x feature is disable
radius servers:
no ip              port  secret
-- --------------- ----- --------------------------------
 1 0.0.0.0          1812 1234
 2 0.0.0.0          1812 1234
```

## 20.7 acl dscp Command

DSCP (Differentiated Services Code Point) is a field in the header of IP packets for packet classification purposes. The QoS (Quality-of-Service) in the Device uses DSCP to provide different level of services and priorities for downstream data transmission.

802.1p enables the Device transmit frames according to their 3-bit priority (0~7) in an 802.1q header. Frames with higher priority are served first.

This Device allows you to overwrite the DSCP priority using 802.1p priority for downstream traffic. Use `acl dscp` commands to configure the mapping between DSCP and 802.1p for DSL ports. Use `switch port dscp` commands to configure the mapping for Gigabit Ethernet interfaces (See Section 32.11.3 on page 700).

### 20.7.1 acl dscp set Command

Syntax:

```
acl dscp set <codepoint> <priority>
```

where

```
codepoint a level of services, 0~63
priority  802.1p priority, 0~7
```

This command sets 802.1p priority for a service level.

The following example sets the service level, 43, to use priority 5 for data transmission.

```
ras> acl dscp set 43 5
```

### 20.7.2 acl dscp show Command

Syntax:

`acl dscp show [slot]`

This command displays the mapping table of service level and 802.1p priority.

The mapping table shows service levels (0~63) and their priority for data transmission. For example, to find the priority level for the service level 43, find 40 in the left hand column and 3 in the top row. The intersection of the 3 column and 40 row gives a priority setting of 5.

```
ras> acl dscp show
         0    1    2    3    4    5    6    7    8    9
       ---- ---- ---- ---- ---- ---- ---- ---- ---- ----
    0    0    0    0    0    0    0    0    0    1    1
   10    1    1    1    1    1    1    2    2    2    2
   20    2    2    2    2    3    3    3    3    3    3
   30    3    3    4    4    4    4    4    4    4    4
   40    5    5    5    5    5    5    5    5    6    6
   50    6    6    6    6    6    6    7    7    7    7
   60    7    7    7    7
```

## 20.8 acl maccount Commands

Use `maccount` commands to limit how many MAC addresses may be dynamically learned or statically configured on a DSL port. MAC count commands are listed next.

You cannot enable both MAC count and MAC filtering on the same port at the same time.

### 20.8.1 acl maccount disable Command

Syntax:

`acl maccount disable <slot-port>`

This command disables the MAC count limit on the specified DSL port(s).

The following example turns off the MAC count limit on DSL port 4 on a line card in slot 5.

```
ras> acl maccount disable 5-4
```

## 20.8.2 acl maccount enable Command

Syntax:

```
acl maccount enable <slot-port>
```

This command enables the MAC count limit on the specified DSL port(s). You can only enable the MAC count filter on DSL ports that do not have the MAC filter enabled.

The following example turns on the MAC count limit on DSL port 4 on a line card in slot 5.

```
ras> acl maccount enable 5-4
```

## 20.8.3 acl maccount set Command

Syntax:

```
acl maccount set <slot-port> <count>
```

where

| | | |
|---|---|---|
| *<count>* | = | Set the limit for how many MAC addresses that a port may dynamically learn. For example, if you are configuring port 2 and you set this field to "5", then only five devices with dynamically learned MAC addresses may access port 2 at any one time. A sixth device would have to wait until one of the five learned MAC addresses ages out.<br>The valid range is from “1” to “128”. |

This command sets the limit for how many MAC addresses may be dynamically learned on the specified DSL port(s).

The following example sets the MAC count filter to allow up to 50 MAC addresses to be dynamically learned on DSL port 4 on the line card in slot 5.

```
ras> acl maccount set 5-4 50
```

## 20.8.4 acl maccount show Command

Syntax:

```
acl maccount show <slot>
```

This command displays the MAC count settings for the DSL port(s). The following example displays the MAC count settings for slot 5.

```
ras> acl maccount show 5
[slot5] maccount
 port enable count
----- ------ -----
 5- 1   -        5
 5- 2   -        5
 5- 3   -        5
 5- 4   -        5
-------------------------- [snip] --------------------------
 5-44   -        5
 5-45   -        5
 5-46   -        5
 5-47   -        5
 5-48   -        5
```

## 20.9 acl macfilter Commands

Use the MAC filter commands to allow only incoming frames from MAC (Media Access Control) address(es) that you specify. MAC filter commands are listed next. You may specify up to ten MAC addresses per port.

You cannot enable both MAC filtering and MAC count on the same port at the same time.

### 20.9.1 acl macfilter delete Command

Syntax:

`acl macfilter delete <slot-port> <mac>`

where

<*mac*> = The source MAC address in "a0:c5:12:34:56:78" format.

This command removes a configured source MAC address from a line card's specified DSL port.

The following example removes the source MAC address of a0:c5:12:34:56:78 from the MAC filter for ADSL port 5.

```
ras> acl macfilter delete 5-4 a0:c5:12:34:56:78
```

## 20.9.2 acl macfilter disable Command

Syntax:

`acl macfilter disable <slot-port>`

This command turns off the MAC filtering feature on a line card's specified DSL port(s).

The following example turns off the MAC filtering feature on DSL port 4 of the line card in slot 5.

```
ras> acl macfilter disable 5-4
```

## 20.9.3 acl macfilter enable Command

Syntax:

`acl macfilter enable <slot-port>`

This command turns on the MAC filtering feature on a line card's specified DSL port(s).

The following example turns on the MAC filtering feature on DSL port 4 of the line card in slot 5.

```
ras> acl macfilter enable 5-4
```

## 20.9.4 acl macfilter mode Command

Syntax:

`acl macfilter mode <slot-port> accept|deny`

where

`accept|deny` = `accept:` Allows frames from MAC addresses that you specify and block frames from other MAC addresses.
`deny:` Blocks frames from MAC addresses that you specify and allow frames from other MAC addresses.

## 20.9.5 acl macfilter set Command

Syntax:

`acl macfilter set <slot-port> <mac>`

where

<*mac*> = The source MAC address in "a0:c5:12:34:56:78" format.

This command adds an allowed source MAC address on a line card's specified DSL port or on the DSL port in all of the line cards DSL ports if no slot is specified.

The following example adds source MAC address a0:c5:12:34:56:78 for DSL port 4 of the line card in slot 5.

```
ras> acl macfilter set 5-4 a0:c5:12:34:56:78
```

### 20.9.6 acl macfilter show Command

Syntax:

`acl macfilter show <slot>|<slot-port>`

This command displays the MAC filtering status (V for enabled, - for disabled) and the fixed source MAC addresses on a line card's specified DSL port(s) or on all of the line card's DSL ports if no port is specified.

The following example displays the MAC filtering status on all ports of the line card in slot 2.

```
ras> acl macfilter show 2
 port  mode  enable  mac address
----- ------ ------ -----------------
 2- 1 accept   -
 2- 2 accept   -
 2- 3 accept   -
 2- 4 accept   -
---------------------- Snip ---------------------
 2-45 accept   -
 2-46 accept   -
 2-47 accept   -
 2-48 accept   -
ras>
```

## 20.10 acl ouifilter Commands

Use the following OUI (Organizationally Unique Identifier) filter commands to filter out packets from devices with the specified OUI in the MAC address field.

The OUI field is the first three octets in a MAC address. An OUI uniquely identifies the manufacturer of a network device and allows you to identify from which device brands the switch will accept traffic or send traffic to. The OUI value is assigned by the IANA.

### 20.10.1 acl ouifilter disable Command

Syntax:

`acl ouifilter disable <slot-port>`

This command deactivates MAC OUI filtering on the port(s) of the specified line card.

### 20.10.2 acl ouifilter enable Command

Syntax:

`acl ouifilter enable <slot-port>`

This command activates MAC OUI filtering on the port(s) of the specified line card.

## 20.10.3 acl ouifilter mode Command

Syntax:

`acl ouifilter mode <slot-port> accept|deny`

where

`accept|deny` = `accept:` Allows frames from MAC addresses with the OUI(s) that you specify and blocks frames with MAC addresses of other OUIs.
`deny:` Blocks frames from MAC addresses with the OUI(s) that you specify and allows frames from other MAC addresses.

This command activates MAC OUI filtering on the port(s) of the specified line card. Use the `acl ouifilter set` command to set the OUI value(s).

The following example sets the system to drop packets with the specified OUI value on port 1 of the line card in slot 3.

```
ras> acl ouifilter mode 3-1 deny
```

## 20.10.4 acl ouifilter set Command

Syntax:

`acl ouifilter set <slot-port> <mac>`

where

<mac> = The first three octets of a MAC address in the format xx:xx:xx. For example, 00:0F:FE.

This command specifies a MAC OUI whose packets you want to filter. Use the `acl ouifilter mode` command to set the action on the matched packets.

The following example sets the system to filter packets with an OUI value of 00-0F-FE on port 1 of the line card in slot 3.

```
ras> acl ouifilter set 3-1 00:0f:fe
```

## 20.10.5 acl ouifilter show Command

Syntax:

`acl ouifilter show <slot>|<slot-port>`

This command displays the OUI filtering status (V for enabled, - for disabled) and the OUI value(s) of the MAC address on a line card's specified DSL port(s) or on all of the line card's DSL ports if no port is specified. The following example displays the OUI filter setting of port 1 on the line card in slot 3.

```
ras> acl ouifilter show 1-1
 port  mode  enable  mac address
----- ------ ------ -----------------
 1- 1 accept   -
```

## 20.11 acl pktfilter Commands

Use the following packet filter commands to filter out specific types of packets on specific ports.

### 20.11.1 acl pktfilter set Command

Syntax:

`acl pktfilter set <slot-port> <type>`

where

`<type>` = `accept-all:` Accept all packet types.

`pppoe-only:` Accept only PPPoE packets and reject all other packet types. (Point-to-Point Protocol over Ethernet) relies on PPP and Ethernet. PPPoE is a specification for connecting the users on an Ethernet to the Internet through a common broadband medium, such as a single DSL line, wireless device or cable modem.

Alternatively, you can have the system reject any combination of the following packet types (separated by a space).

`ip:` Reject IP packets. Internet Protocol. The underlying protocol for routing packets on the Internet and other TCP/IP-based networks.

`arp:` Reject ARP packets. Address Resolution Protocol is a protocol for mapping an Internet Protocol address (IP address) to a physical computer address that is recognized in the local network.

`dhcp:` Reject DHCP packets. Dynamic Host Configuration Protocol automatically assigns IP addresses to clients when they log on. DHCP centralizes IP address management on central computers that run the DHCP server program. DHCP leases addresses, for a period of time, which means that past addresses are “recycled” and made available for future reassignment to other systems.

`eapol:` Reject EAPol packets. EAP (Extensible Authentication Protocol, RFC 2486) over LAN. EAP is used with IEEE 802.1x to allow additional authentication methods (besides RADIUS) to be deployed with no changes to the access point or the wireless clients.

`pppoe:` Reject PPPoE packets.

`netbios:` Reject NetBIOS packets. (Network Basic Input/Output System) are TCP or UDP broadcast packets that enable a computer to connect to and communicate with a LAN.

`igmp:` Reject IGMP packets. Internet Group Multicast Protocol is used when sending packets to a specific group of hosts.

This command sets the packet type filter for the specified ADSL port(s).

The following example sets DSL port 4 of the line card in slot 5 to reject ARP, PPPoE and IGMP packets.

```
ras> acl pktfilter set 5-4 arp pppoe igmp
```

### 20.11.2 acl pktfilter show Command

Syntax:

`acl pktfilter show <slot>`

This command displays the packet type filter settings on the specified line card's DSL port(s).

The following example displays the packet type filter settings for the DSL ports of the line card in slot 5.

```
ras> acl pktfilter show 5
 port filter
----- ------------------------------------
 5- 1 accept-all
 5- 2 accept-all
 5- 3 accept-all
------------------------- [snip] -------------------------
 5-45 accept-all
 5-46 accept-all
 5-47 accept-all
 5-48 accept-all
```

## 20.12 PPPoE Agent Information

Similar to DHCP relay option82, you can set the switch to insert line information into client PPPoE Active Discovery Initialization (PADI) packets. This allows a PPPoE termination server to identify and authenticate a PPPoE client based on the specified information (such as the ISP name or line card number).

### 20.12.1 acl pppoeagent clearinfo Command

Syntax:

`acl pppoeagent clearinfo <vid>`

This command resets the PPPoE line description for subscribers in the specified VLAN.

### 20.12.2 acl pppoeagent enable Command

Syntax:

`acl pppoeagent enable <vid>`

This command turns on PPPoE line information for subscribers in the specified VLAN. The switch adds line information to PPPoE discover packets for user authentication and identification.

The following example activates the PPPoE agent setting for VLAN 10.

```
ras> acl pppoeagent enable 10
```

### 20.12.3 acl pppoeagent delete Command

Syntax:

`acl pppoeagent delete <vid>`

This command removes PPPoE line information setting for the specified VLAN.

### 20.12.4 acl pppoeagent disable Command

Syntax:

`acl pppoeagent disable <vid>`

This command sets the switch to not add line information in PPPoE discover packets.

### 20.12.5 acl pppoeagent info Command

Syntax:

`acl pppoeagent info <vid> <description>`

This command specifies the PPPoE line information the switch is to add to PPPoE discover packets from the specified VLAN. Enter a description (up to 24 alphanumerical characters).

Before you can configure PPPoE agent information, you must first create a entry using the `acl pppoeagent set` command.

The following example sets the switch to add “testing” as the line information to PPPoE discover packets on VLAN 10.

```
ras> acl pppoeagent set 10
ras> acl pppoeagent enable 10
ras> acl pppoeagent info 10 testing
ras> acl pppoeagent show
vid  en    info
---- ----- ------------------------
10     V   testing
vlan set: 1
ras>
```

### 20.12.6 acl pppoeagent optionmode Command

Syntax:

`acl pppoeagent optionmode <vid> private|tr101 [vid on|off]`

This command selects the method (Private or TR-101) in which PPPoE line information is encoded in PPPoE discover packets on the specified VLAN, and whether the VLAN ID is transmitted within the packet or not. The `vid on|off` option applies to the TR-101 mode only. See Section 11.11 on page 221 for more information on Private and TR-101 modes.

The following example sets VLAN 10 to use TR-101 encoding, and to transmit the VLAN ID in PPPoE discover packets.

```
ras> acl pppoeagent optionmode 10 tr101 vid on
```

### 20.12.7 acl pppoeagent set Command

Syntax:

`acl pppoeagent set <vid>`

This command creates a PPPoE agent information entry for the VLAN. After you have created an entry for a VLAN, you can configure the line information settings. The following example creates an entry for VLAN 10.

```
ras> acl pppoeagent set 10
```

### 20.12.8 acl pppoeagent show Command

Syntax:

`acl pppoeagent show`

This command displays PPPoE line information settings. The following figure shows the PPPoE agent setting for VLAN 10.

```
ras> acl pppoeagent show
vid  en    info
---- ----- ------------------------
10     V   testing
vlan set: 1
ras>
```

## 20.13 acl rule Commands

Use the `acl rule` commands to apply ACL profiles (you created using the `profile acl` commands) on the PVCs.

### 20.13.1 acl rule delete Command

Syntax:

`acl rule delete <slot-port-vpi/vci> <profile>`

where

`<profile>` = Name of an access control profile.

This command allows you to remove an access control settings from the specified PVC.

### 20.13.2 acl rule set Command

Syntax:

`acl rule set <slot-port-vpi/vci> <profile>`

where

`<profile>` = Name of an access control profile.

This command allows you to apply an access control profile to the specified DSL link(s). You can apply up to eight profiles to a subscriber port.

The following example applies the “example” rule to PVC.

```
ras> acl rule set 3-1-0/33 example
```

### 20.13.3 acl rule show Command

Syntax:

`acl rule show <slot-port-vpi/vci>`

This command displays the current access control rule assignment settings. The following figure shows an example.

```
ras> acl rule show 3-1-0/33
pvc             profile
--------------- ------------------------------
3-1-0/33        example
ras>
```

## 20.14 acl usbcastctrl Commands

Use the `acl usbcastctrl` commands to configure maximum bandwidth settings for all upstream traffic entering the MSC1000G.

### 20.14.1 acl usbcastctrl set

Syntax:

`acl usbcastctrl set <rate>`

This command sets the maximum bandwidth for all upstream broadcast traffic entering the MSC1000G.

The following figure shows an example.

```
ras> acl usbcastctrl enable
ras> acl usbcastctrl set 96
```

## 20.14.2 acl usbcastctrl show

Syntax:

```
acl usbcastctrl show
```

This command shows the maximum bandwidth for all upstream broadcast traffic entering the MSC1000G.

The following figure shows an example.

```
ras> acl usbcastctrl show
usbcastctrl enable
usbcastctrl rate = 96
```

# 21

# alarm Commands

This chapter describes the alarm management commands.

## 21.1 General alarm Command Parameters

The following table describes commonly used `alarm` command parameter notation.

**Table 221** General alarm Command Parameters

| NOTATION | DESCRIPTION |
|---|---|
| *alarm* | Specify a category of alarms.<br>`eqpt` represents equipment alarms.<br>`dsl` represents Digital Subscriber Line (DSL) alarms.<br>`enet` represents Ethernet alarms.<br>`sys` represents system alarms.<br>`all` specifies every alarm category. |
| *severity* | Specify an alarm severity level (`critical`, `major`, `minor`, `info` or `all`). |
| *condition* | Specify an alarm condition. `condition\|code\|all` |
| *sdate* | Specify a start date in yyyy/mm/dd format. |
| *edate* | Specify an end date in yyyy/mm/dd format. |
| *target* | `snmp\|syslog\|all\|none` 'none' disables alarm reports on this alarm category. |
| `for\|rev` | Specify the displaying order. `for` = forward, `rev` = reverse |
| `detail` | Display more comprehensive alarm condition descriptions. |
| *fac* | This is an alarm category. Options are: `local1~local7` |

## 21.2 alarm Commands Summary

The following table lists the `alarm` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 222** alarm Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `alarm` | `clear` | | | Erases historic alarm entries. | M |
| | `cutoff` | | | Cancels an alarm. This stops the sending of the alarm signal current. | M |

**Table 222** alarm Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | edit | <alarm>\|all <*fac*> <*target*>[,<target>] | | Edits an alarm report entry. | M |
| | xedit | <alarm> <*cond*> <severity> <fac> <target>[,<*target*>] <*clearable*> | | Sets the severity level of an alarm(s) and where the system is to send the alarm(s).<br>*clearable*: Options are clearable or unclearable. | M |
| | history | clear | <*alarm*>\|all <*condition*>\|all | Removes historic alarm entries by alarm category and alarm condition or by severity. | M |
| | | clear | <*severity*> | | |
| | | show | [<*severity*>\|all] [<*alarm*>\|all] [<*condition*>\|all] [<*sdate*>\|all] [<*edate*>\|all] [for\|rev] [detail] | Displays historic alarms by severity, alarm category and alarm condition. You can also display detailed alarms. | L |
| | input | name | <*index*> <*name*> | Sets the names for external alarms.<br>*index*: 1~4. This is the index number for the external alarm input.<br>*name*: Enter 1 to 31 characters for the name of the connected external alarm system. | M |
| | | show | | Displays the external alarm names. | L |
| | port | show | <*slot*> | Displays port alarm severity level thresholds. | L |
| | | set | all\|mgmt\|<*giga-port*>\|<*slot-port*> <*severity*> | Sets the severity of alarms to record for individual ports.<br>mgmt: This is the management port. | M |
| | show | | [<*severity*>\|all] [<*alarm*>\|all] [<*condition*>\|all] [<*sdate*>\|all] [<*edate*>\|all] [for\|rev] [detail] | Displays current alarms by severity, alarm category or alarm condition. You can also display detailed alarms. | L |
| | tablelist | | [<*alarm*>\|all] [<*severity*>\|all] [<*fac*>\|all] [<*target*>[,<*target*>]] [<*condition*>\|all] | Displays the supported alarm list and report settings. | L |

# 21.3 alarm Commands

Use these commands to view and clear alarms. You can also set the device to report alarms to an SNMP or syslog server that you specify.

## 21.3.1 alarm clear Command

Syntax:

`alarm clear`

This command erases (clearable) historic alarm entries.

## 21.3.2 alarm cutoff Command

Syntax:

`alarm cutoff`

This command cancels an alarm. This stops the sending of the alarm signal current. This is useful in stopping an alarm if you have the alarm output connector pins connected to a visible or audible alarm. The alarm entry remains in the system.

## 21.3.3 alarm edit Command

Syntax:

*`alarm edit <alarm> <fac> <target>[,<target>]`*

where

| | | |
|---|---|---|
| *<fac>* | = | The log facility (`local1~local7`) that has the device log the syslog messages to different files in the syslog server. See your syslog program's documentation for details. |
| *<target>* | = | `snmp\|syslog\|all\|none` The type of alarm messages that the device is to send (SNMP, syslog or all). `none` disables alarm reports on this alarm category. |

This command creates or edits an alarm report entry.

The following example creates an alarm report entry that sends system alarms to an SNMP server at the local 3 log facility.

```
ras> alarm edit sys local3 snmp
```

## 21.3.4 alarm history clear Command

Syntax:

`alarm history clear [`*`<alarm>`*`|all <`*`condition`*`>|all] <`*`severity`*`>`

This command removes historic alarm entries by alarm category, alarm condition or severity.

The following example removes the historic minor level alarms for all alarm categories, and all conditions.

```
ras> alarm history clear minor
```

## 21.3.5 alarm history show Command

Syntax:

`alarm history show [<severity>|all] [<alarm>|all] [<condition>|all] [<sdate>|all] [<edate>|all] [for|rev] [detail]`

This command displays historic alarms by severity, alarm category or alarm condition.

The following example displays the historic major level alarms for all alarm categories, and all conditions.

```
ras> alarm history show major
    no alarm   condition                severity timestamp      source
------ ------  ----------------------- -------- -------------- -------
     1 eqpt   +LT_INACTIVE              major    09/09 09:38:54 slot 4
     2 eqpt   +LT_INACTIVE              major    09/09 09:38:54 slot 9
     3 eqpt   -LT_INACTIVE              major    09/09 09:39:25 slot 4
     4 eqpt   -LT_INACTIVE              major    09/09 09:39:28 slot 9
```

## 21.3.6 alarm port set Command

Syntax:

`alarm port set all|mgmt|<giga-port>|<slot-port> <severity>`

where

| | | |
|---|---|---|
| <*fac*> | = | The log facility (`local1~local7`) that has the device log the syslog messages to different files in the syslog server. See your syslog program's documentation for details. |
| <*target*> | = | `snmp\|syslog\|all\|none` The type of alarm messages that the device is to send (SNMP, syslog or all). `none` disables alarm reports on this alarm category. |

This command sets the alarm severity threshold for recording alarms on an individual port(s). The system reports an alarm on a port if the alarm has a severity equal to or higher than the port's threshold.

The following example has the systems only record critical alarms on DSL port 7 on the line card in slot 4.

```
ras> alarm port set 4-7 critical
```

## 21.3.7 alarm port show Command

Syntax:

`alarm port show <slot>`

where

| | | |
|---|---|---|
| <*fac*> | = | The log facility (`local1~local7`) that has the device log the syslog messages to different files in the syslog server. See your syslog program's documentation for details. |
| <*target*> | = | `snmp\|syslog\|all\|none` The type of alarm messages that the device is to send (SNMP, syslog or all). `none` disables alarm reports on this alarm category. |

This command displays port alarm severity level thresholds. The system reports an alarm on a port if the alarm has a severity equal to or higher than the port's threshold.

The following example displays the port alarm thresholds for the ports on the line card in slot 4. "ifindex" identifies the interface.

```
ras> alarm port show 4

  ifindex       severity
----------    -----------
  4- 1           minor
  4- 2           minor
  4- 3           minor
-------------------------- [snip] --------------------------
  4-44           minor
  4-45           minor
  4-46           minor
  4-47           minor
  4-48           minor
```

## 21.3.8 alarm show Command

Syntax:

`alarm show [<`*severity*`>|all] [<`*alarm*`>|all] [<`*condition*`>|all] [<`*sdate*`>|all] [<`*edate*`>|all] [for|rev] [detail]`

where

| | | |
|---|---|---|
| `[detail]` | = | Display in depth alarm information. |

This command displays the current alarms by severity, alarm category or alarm condition.

The following example displays the critical level alarms for all alarm categories and conditions.

```
ras> alarm show critical all
[current card alarm]
id  state     card type       heat vol mon down out
--- --------- --------------- ---------------------
 1  standby   MSC1000G          -   -   -    -   -
 2  active    MSC1000G          -   -   -    -   -
 3  -                           -   -   -    -   -
 4  -         ALC1248G-53       -   -   -    V   V
 5  active    ALC1248G-53       -   -   -    -   -
 6  -                           -   -   -    -   -
 7  -         ALC1248G-51       -   -   -    V   V
 8  -                           -   -   -    -   -
 9  -         ALC1248G-53       -   -   -    V   V
10  -         ALC1248G-53       -   -   -    V   V

[current alarm list]
    no alarm   condition                severity timestamp      source
------ ------  ----------------------- -------- -------------- -----------
---
     1 eqpt   +FAN_ERROR               critical 12/14 13:46:41 slot 2
     2 eqpt   +FAN_ERROR               critical 12/14 13:46:41 slot 2
     3 eqpt   +FAN_ERROR               critical 12/14 13:46:41 slot 2
     4 eqpt   +FAN_ERROR               critical 12/14 13:46:41 slot 2
     5 eqpt   +FAN_ERROR               critical 12/14 13:46:41 slot 2
     6 eqpt   +FAN_ERROR               critical 12/14 13:46:41 slot 2
     7 eqpt   +DC_POWER_FAIL           critical 12/14 13:46:21 slot 2
```

## 21.3.9 alarm tablelist Command

Syntax:

`alarm tablelist [<`*alarm*`>|all] [<`*severity*`>|all] [<`*fac*`>|all][<`*target*`>[,<`*target*`>]] [<`*condition*`>|all]`

where

- <*fac*> = The log facility (`local1~local7`) that has the device log the syslog messages to different files in the syslog server. See your syslog program's documentation for details.
- <*target*> = `snmp|syslog|all` The type of alarm messages that the device is to send (SNMP, syslog or all).

This command displays the supported alarm list and report settings.

The following example displays the supported alarms for all alarm levels, all alarm categories, all facilities, all types of alarm messages and all conditions.

```
ras> alarm tablelist
 no alarm       (code)condition        facility snmp syslog severity
clearable
--- ------ ------------------------  --------- ---- ------ -------- -------
  1   dsl  ( 5002)LINE_UP             local1    V     V    info       -
  2   dsl  ( 5003)LINE_DOWN           local1    V     V    minor      V
  3   dsl  ( 5006)LINE_LDM_START      local1    V     V    info       -
  4   dsl  ( 5007)LINE_LDM_END        local1    V     V    info       -

 ------------------------- [snip] -------------------------

 17   dsl  ( 5024)SHDSL_TCA_SNRM      local1    V     V    info       V
 18   dsl  ( 5025)SHDSL_TCA_ES        local1    V     V    info       V
 19   dsl  ( 5026)SHDSL_TCA_SES       local1    V     V    info       V

    Press any key to continue, 'e' to exit, 'n' for nopause
```

## 21.3.10 alarm xedit Command

Syntax:

`alarm xedit <alarm> <cond> <severity> <fac> <target>[,<target>] <clearable>`

where

| | | |
|---|---|---|
| *<cond>* | = | <condition>\|<code>\|all: The condition is the text description for the condition under which the alarm applies. Use the `alarm tablelist` command to find alarm conditions.<br>The condition code is the number of a specific alarm message. Use the `alarm tablelist` command to find alarm condition codes. |
| *<fac>* | = | The log facility (`local1~local7`) that has the device log the syslog messages to different files in the syslog server. See your syslog program's documentation for details. |
| *<target>* | = | `snmp\|syslog\|all\|none:` The type of alarm messages that the device is to send (SNMP, syslog or all). `none` disables alarm reports on this alarm category. |
| *<clearable>* | = | `clearable\|unclearable:` This sets whether or not the alarm can be manually cleared from the system. |

This command sets the severity level of an alarm(s) and where the system is to send the alarm(s). You can also set whether or not the alarm can be manually cleared from the system.

Use the `alarm tablelist` command to display alarm setting details.

The following example creates an alarm report entry that sets all system alarms to the major severity level and sends them to a syslog server at the local 3 log facility. It also sets the system alarms to be manually clearable.

```
ras> alarm xedit sys all major local3 syslog clearable
```

# 22

# clear Commands

This chapter describes the clear commands that you use to reset the various system counters.

## 22.1 clear Commands Summary

The following table lists the clear commands you can use to reset the counters. Once you reset a counter, you can only display new counter information using the `show` command.

**Table 223** clear Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `clear` | `atm` | *<slot-port>\|<slot-port-vpi/vci>* | | Resets ATM counters on the specified port or PVC. | M |
| | `dhcp` | `counter` *<slot-port>* | | Resets DHCP counters. | M |
| | `enet` | `<giga-port> [<vid>]\|<slot>` | | Clears records for the Ethernet port | M |
| | `igmp` | `info` | | Resets IGMP records and the number of learned IGMP groups. | M |
| | | `port info` | *<slot-port>* | Resets the records of IGMP packets received and the number of learned groups on a port. | M |
| | `ip` | `inband\|outband\|both` | | Resets management records.<br>`outband`: The out-of-band management port.<br>`inband`: The in-band ports. | M |
| | `lineperf` | *<slot-port>* | | Resets subscriber line performance records. | M |
| | `packet` | *<slot-port>\|<slot-port-vpi/vci>* | | Resets the packet transmission records on a subscriber port or PVC. | M |
| | `paepvc` | `counter` | *<slot-port>\|<slot-port-vpi/vci>* | Resets the PAE PVC records. | M |
| | `performance` | `<slot-port> curr\|15min\|1day` | | Resets subscriber line performance records. | M |

## 22.2 clear Command Example

The following example resets the IGMP counters on the system. This clears the IGMP counters and the number of IGMP groups learned.

```
ras> clear igmp info
```

# 23

# cluster Commands

This chapter describes the cluster management commands.

## 23.1 General cluster Command Parameters

The following table describes commonly used `cluster` command parameter notation.

**Table 224** General cluster Command Parameters

| NOTATION | DESCRIPTION |
|---|---|
| *name* | The device name (<=32 characters) |
| *password* | The device password (<=32 characters). |
| *id* | The index number for this cluster. |

## 23.2 cluster commands Summary

The following table lists the `cluster` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 225** cluster Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `cluster` | `disable` | | | Disables clustering. | M |
| | `enable` | `manager` | *<name>* | Enables device as cluster manager. | M |
| | | `member` | *<password>* | Enables the device as cluster member. | M |
| | `login` | | *<id>* | Logs in into a client. | M |
| | `member` | `candidate` | `show` | Lists all available candidates. | M |
| | | | `flush` | Flushes current candidates. | M |
| | | `delete` | *<id>* | Removes a member from a cluster. | M |
| | | `set` | *<id> <mac> <password>* | Adds a member to the cluster. | M |
| | | `show` | | Displays cluster member settings. | L |
| | `show` | | | Displays the cluster member status. | L |
| | `vlan` | | *<vid>* | Sets the cluster VLAN ID. | M |

## 23.2.1 cluster disable Command

Syntax:

```
cluster disable
```

This command sets this DSLAM to not function as part of the cluster.

## 23.2.2 cluster enable manager Command

Syntax:

```
cluster enable manager <name>
```

where

<*name*> = A name to identify the cluster. You may use up to 32 printable characters. Spaces are not allowed.

This command sets this DSLAM as the cluster manager DSLAM. A cluster can only have one manager. Other cluster managers do not display in the cluster candidate list.

The following example sets the DSLAM to be the cluster manager and use “Manager-A” as the cluster name.

```
ras> cluster enable manager Manager-A
```

## 23.2.3 cluster enable member Command

Syntax:

```
cluster enable member <password>
```

where

<*password*> = Type the cluster member’s management password. If the administrator changes the device’s management password afterwards, then it cannot be managed from the cluster manager.

This command sets this DSLAM to be a cluster member. The device will display in the cluster candidate list.

The following example sets the DSLAM to be a cluster member. The DSLAM’s management password is “1234”.

```
ras> cluster enable member 1234
```

## 23.2.4 cluster login Command

Syntax:

```
cluster login <id>
```

where

<*id*> = The member’s ID number (2~8).

This command lets you open the DSLAM's CLI via the cluster manager DSLAM.

The following is an example. After you log into a cluster member, the cluster name and the member's ID number display in the command prompt.

```
ras> cluster login 2
Copyright (c) 1994 - 2006 ZyXEL Communications Corp.
```

## 23.2.5 cluster member candidate show Command

Syntax:

`cluster member candidate show`

This command displays potential cluster member DSLAMs that were found by auto-discovery. The DSLAMs must be directly connected and in the same VLAN group. You must have also logged into that device and configured it as a cluster member.

A device can only be part of one cluster at a time. If a device is already in another cluster, it does not display here. Devices that are set to be cluster managers will not be visible.

## 23.2.6 cluster member candidate flush Command

Syntax:

`cluster member candidate flush`

This command updates the list of suitable candidates found by auto-discovery.

## 23.2.7 cluster member delete Command

Syntax:

`cluster member delete <id>`

where

<*id*> = The member's ID number (2~8).

This command removes the specified cluster member from the cluster.

The following example removes the cluster member DSLAM with ID 3 from the cluster.

```
ras> cluster member delete 3
```

## 23.2.8 cluster member set Command

Syntax:

`cluster member set <id> <mac> <password>`

where

| | | |
|---|---|---|
| *<id>* | = | An ID number (2~8) for the cluster member. |
| *<mac>* | = | The hardware MAC address of the device |
| *<password>* | = | The cluster member's management password. If the administrator changes the device's management password afterwards, then it cannot be managed from the cluster manager. |

This command adds the specified cluster member to the cluster.

The following example adds a DSLAM as cluster member 4. The DSLAM's MAC address is "00:13:49:d1:d0:cd" and its password is "1234".

```
ras> cluster member set 4 00:13:49:d1:d0:cd 1234
```

## 23.2.9 cluster member show Command

Syntax:

`cluster member show`

This command displays a list of the cluster members. ID 1 is the cluster manager.

The following is an example.

```
ras> cluster member show
member list:
id mac
-- -----------------
 1 00:13:49:d1:d0:bc
 2 -
 3 -
 4 -
 5 -
 6 -
 7 -
 8 -
```

## 23.2.10 cluster show Command

Syntax:

`cluster show`

This command displays status information about the cluster.

The following is an example.

```
ras> cluster show
mode         :manager
vlan         :4094
name         :Manager-A
member list:
id state    hostname        uptime        model            mac
-- -------- --------------- ------------- ---------------- -----------------
 1 active                       02:20:38 IES-5000         00:13:49:d1:d0:bc
 2 -
 3 -
 4 -
 5 -
 6 -
 7 -
 8 -
```

where

| | | |
|---|---|---|
| *mode* | = | Whether this device is the manager of the cluster or a member. |
| *vlan* | = | This is the VLAN ID that the cluster uses and is only applicable if the manager DSLAM is set to use IEEE 802.1Q VLAN. All DSLAMs must be directly connected and in the same VLAN group to belong to the same cluster. This field is ignored if the clustering manager is using port-based VLAN. |
| *name* | = | This is the name of the cluster. |
| member list | = | This table lists the DSLAMs that belong to the cluster. |
| *id* | = | The DSLAM's ID number in the cluster. 1 is the cluster manager. |
| *state* | = | This column displays the status of this DSLAM within the cluster.<br>**active**: The member is fine.<br>**inactive**: The manager can not communicate the member.<br>**waiting**: The manager has sent a command to add the member and is waiting for a response.<br>**error**: The member reported that the password was wrong. |
| hostname | = | This is the cluster DSLAM's system name. |
| uptime | = | This is how long the DSLAM has been turned on and in the cluster. |
| model | = | This field displays the model name of the DSLAM. |
| mac | = | This is the DSLAM's hardware MAC address. |

## 23.2.11 cluster vlan Command

Syntax:

`cluster vlan <`*`vid`*`>`

where

| | | |
|---|---|---|
| <*vid*> | = | This is the cluster management VLAN ID. The cluster's DSLAMs must be directly connected and in the same VLAN group. The cluster management VID must be different from the management VID. |

This command sets the VLAN ID for the cluster.

The following example sets the cluster VID to 79.

```
ras> cluster vlan 79
```

## 23.3 Cluster Member Firmware and Configuration File Management

You can use FTP to upload firmware to a cluster member through the cluster manager. You can also upload or download configuration files. The following example shows uploading MSC1000G firmware to cluster member 2. See Chapter 36 on page 759 for more on uploading firmware and uploading or downloading configuration files.

**Figure 269** FTP Upload to a Cluster Member Example

```
C:\>ftp 123.23.19.228
Connected to 123.23.19.228.
220  FTP version 1.0 ready at Fri Nov 10 10:53:52 2006
User (123.23.19.228:(none)): admin
331 Enter PASS command
Password:
230 Logged in
226 File sent OK
ftp> bin
200 Type I OK
ftp> cd member-2
257 "/node-2" is current directory
ftp> put 370AIN0b5.bin
200 Port command okay
150 Opening data connection for STOR ras
226 File received OK
ftp: 3558910 bytes sent in 3.89Seconds 914.65Kbytes/sec.
ftp>
```

The following table explains some of the FTP parameters.

**Table 226** FTP Upload to a Cluster Member Example

| FTP PARAMETER | DESCRIPTION |
|---|---|
| User | Enter “admin”. |
| Password | The web configurator password default is 1234. |
| bin | Changes the transfer mode to binary. |
| V3.70(ABF.0)b5 | This is the name of the firmware file you want to upload to the cluster member. |
| cd member-2 | Use “cd member-” and the index number of the cluster member to which you want to upload firmware. This index number matches the member’s number in the |

# 24

# config Commands

This chapter describes the configuration file management commands.

## 24.1 config Commands Summary

The following table lists the `config` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 227** config Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `config` | `default` | | | Resets factory default configuration. | H |
| | `save` | | | Saves current configuration to non-volatile memory. | M |
| | `show` | `sys\|ip\|switch\|port\|profile\|acl\|vlan\|multicast\|all [nopause]` | | Displays the current configuration. | L |

### 24.1.1 config default Command

Syntax:

```
ras> config default
```

This command resets the system to the factory default configuration. The system restarts with the factory default settings.

Do not turn off your device while returning to the default configuration.

### 24.1.2 config save Command

Syntax:

```
ras> config save
```

This command saves your configuration when you are done with a configuration session. This command saves all system configuration to nonvolatile memory. You must use this command to save any configuration changes that you make, otherwise the system returns to its previously saved settings when it is restarted. Save your changes after each configuration session.

Nonvolatile memory refers to the MSC1000G's storage that remains even if the power is turned off. Configuration saved in the run time (volatile) memory is lost when the power is turned off.

Do NOT turn off your device while saving your configuration.

### 24.1.3 config show Command

Syntax:

```
ras> config show sys|ip|switch|port|profile|acl|vlan|multicast|all [nopause]
```

This command shows the configuration of the specified category. `nopause` allows you to show all settings at one time so you do not need to press a key to continue.

An example is shown next.

```
ras> config show ip nopause
================= ip ====================================
================= ip/show ====================
interface   interface ip     netmask       vid
--------- --------------- --------------- ----
inband    123.23.15.86    255.255.255.0      1
outband   192.168.0.1     255.255.255.0      -
gateway: 123.23.15.254

================= ip/arp ======================
ip address       time ether address     interface
--------------- ----- ----------------- ----------
123.23.14.10      240 00:0d:60:cb:cc:ae inband
123.23.14.12      270 00:0e:7f:a8:90:13 inband
123.23.14.16      260 00:0d:60:cb:22:4c inband
123.23.14.19      290 00:0e:7f:a9:80:70 inband
123.23.14.35      260 00:a0:c5:b2:6a:43 inband
123.23.14.91      240 00:0a:e4:0a:76:21 inband
123.23.14.99      270 00:0b:cd:fc:30:45 inband
123.23.14.250     270 00:a0:c5:8e:9d:16 inband
123.23.15.172     300 02:0e:a6:89:41:60 inband
123.23.15.254     300 00:04:80:9b:78:00 inband
arp entry: 18

================= ip/route ==================
dest               interface  gateway         metric name
------------------ ---------- --------------- ------ ----------------
192.168.0.0/24     outband    192.168.0.1          1 -
123.23.15.0/24     inband     123.23.15.86         1 -
default            inband     123.23.15.254        1 -
```

# 25

# diagnostic Commands

This chapter describes the `diagnostic` commands.

## 25.1 Terms and Definitions

This section lists the terms and definitions appearing in several commands in this section. Refer to your User's Guide for more detailed information.

**Table 228** CFM Terms and Definitions

| TERM | DESCRIPTION |
|---|---|
| CFM | CFM (Connectivity Fault Management) is used to detect, analyze connectivity faults in bridged LANs. |
| MD | An MD (Maintenance Domain) is a group identified by a level number. You can create more than one MA group in one MD. |
| MA | An MA (Maintenance Association) is a group identified by a VLAN ID. One MA should belong to one and only one MD group. |
| CFM Domain | A CFM domain is a group identified by an MD and an MA. For example, ports in MD level 1 and MA VLAN 2 are in the same CFM domain while ports in MD level 7 and MA VLAN 2 are in another CFM domain. |
| CFM Loop Back Test | Loop Back Test (LBT) checks if the MEP port receives its LBR (Loop Back Response) from its target after it sends the LBM (Loop Back Message). If no response is received, there might be a connectivity fault between them. |
| CFM Link Trace Test | Link Trace Test (LTT) provides additional connectivity fault analysis to get more information on where the fault is. In the link trace test, MIP ports also send LTR (Link Trace Response) to response the source MEP port's LTM (Link Trace Message). If an MIP or MEP port does not respond to the source MEP, this may indicate a fault. Administrators can take further action to check and resume services from the fault according to the line connectivity status report. |
| MEP | An MEP port has the ability to send and reply the CCMs, LBMs and LTMs. It also gets other MEP port information from neighbor switches' CCMs in an MA. |
| MIP | An MIP port forwards the CCMs, LBMs, and LTMs and replies the LBMs and LTMs by sending Loop Back Responses (LBRs) and Link Trace Responses (LTRs). |

## 25.2 General diagnostic Command Parameters

The following table describes commonly used `diagnostic` command parameter notation.

**Table 229** General diagnostic Command Parameters

| NOTATION | DESCRIPTION |
|---|---|
| *md-name* | The maintenance domain name (length<32). |
| *ma-name* | The maintenance association name (length<16). |
| *ep-id* | The endpoint identifier (1~8191). |
| *remote-ep-id* | The remote end point identifier (1~8191). |
| *mac* | The remote end point's MAC address. |

## 25.3 diagnostic Commands Summary

The following table lists the `diagnostic` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 230** diagnostic Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| diagnostic | cfm | loopback | *<md-name> <ma-name> <ep-id> <remote-ep-id>\|<mac>* | Specifies the MD name, MA name, MEP ID, destination (MEP ID or MAC address) to perform a loopback test.<br>This enables the MEP port (with the specified MEP ID) in a specified CFM domain to send the LBMs (Loop Back Messages) to a specified remote end point. | M |
| | | linktrace | set *<md-name> <ma-name> <ep-id> <remote-ep-id>\|<mac> <ttl>* | Specifies the MD name, MA name, MEP ID, destination (MEP ID or MAC address) to perform a link trace test.<br>This enables the MEP port (with the specified MEP ID) in a specified CFM domain to send the LTMs (Link Trace Messages) to a specified remote end point.<br>*ttl*: This is Time-To-Live value (1~63 seconds). Sets this to stop a test once it exceeds the time duration without receiving any response. | M |
| | | | show *<md-name> <ma-name> <ep-id>* [*<ltm-id>* [*ltr-index*]] | Displays a link trace test report. You can see detailed test report by specifying the *ltm-id* or *ltm-id ltr-index*.<br>*ltm-id*: This is the index number of the link trace messages sent in a link trace test.<br>*ltr-index*: This is the index number of the link trace responses received in the Device in a link trace test. | L |

**Table 230** diagnostic Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | ldm | show | <*slot-port*> result\|hlin\|hlog\|qln\|snr | A Loop Diagnostic Mode test provides details about the condition of an ADSL line. This feature is applicable for ALC line cards only.<br>Displays the most recent loop diagnostic mode test results for the specified subscriber port. | M |
| | | test | <*slot-port*> | Sets the specified subscriber port to loop diagnostic mode and displays the results. | M |
| | loopback | f5 | <*slot-port-vpi/vci*> | Performs an OAMF5 loopback test on the specified subscriber port or PVC. | M |
| | mlt | test | <*slot-port*> all\|vac\|vdc\|rload\|riso\|cap\|ren\|ring\|metering [force] | Perform the specified Metallic Line Test on the specified VoIP line card port.<br>all: perform all tests<br>vac: test AC voltage<br>vdc: test DC voltage<br>rload: test load resistance<br>riso: test isolation resistance<br>cap: test capacitance<br>ren: test ringer equivalent number<br>ring: test ring voltage<br>metering: test metering voltage<br>force: perform the test(s) immediately even if the specified VoIP line card port is in use. | M |
| | | show | <*slot-port*> | Displays the result of the Metallic Line Test last performed on this port. | L |
| | | relay set | <*slot-port*> in\|out\|both\|off | Turns the test relay in/out function on/off. | M |
| | | relay show | | Displays the current MLT relay status of each VoIP line card's ports. | L |
| | selt | test | <*slot-port*> | Starts SELT on the port. Single End Loop Test (SELT) checks the distance to the subscriber's location.<br>This feature is applicable for ALC line and VLC cards only.<br>Note: The port must have an open loop. There cannot be a DSL device, phone, fax machine or other device connected to the subscriber's end of the telephone line. | M |
| | | show | <*slot-port*> | Displays the SELT result (such as line type and loop length). | M |

# 25.4 diagnostic Commands

Use these commands to execute a specified diagnostic or test function to an interface port or a subscriber port.

## 25.4.1 diagnostic cfm loopback Command

Syntax:

`diagnostic cfm loopback <md-name> <ma-name> <ep-id> <remote-ep-id>|<mac>`

where

| | | |
|---|---|---|
| *md-name* | = | The maintenance domain name (length<32). |
| *ma-name* | = | The maintenance association name (length<16) |
| *ep-id* | = | The endpoint identifier (1~8191). |
| *remote-ep-id* | = | The remote end point identifier (1~8191). |
| *mac* | = | The remote end point's MAC address. |

This enables the MEP port (with the specified MEP ID) in a specified CFM domain to send the LBMs (Loop Back Messages) to a specified remote end point.

Specify the MD name, MA name, MEP ID, destination (MEP ID or MAC address) to perform a loopback test.

The following shows an example.

```
ras> diagnostic cfm loopback testmd testma 1 2
loopback repId 2
received response
ras> diagnostic cfm loopback testmd testma 1 00:13:49:00:00:02
loopback 00:13:49:00:00:02
received response
```

## 25.4.2 diagnostic cfm linktrace show Command

Displays a link trace test report.

Syntax:

`diagnostic cfm linktrace show <md-name> <ma-name> <ep-id> [<ltm-id> [ltr-index]]`

where

| | | |
|---|---|---|
| *md-name* | = | The maintenance domain name (length<32). |
| *ma-name* | = | The maintenance association name (length<16) |
| *ep-id* | = | The endpoint identifier (1~8191). |

| | | |
|---|---|---|
| *ltm-id* | = | This is the index number of the link trace messages sent in a link trace test. |
| *ltr-index* | = | This is the index number of the link trace responses received in the system in a link trace test. |

Use this command to display the most recent loop diagnostic mode test results for an ADSL or VDSL port. Use the loop diagnostics results to analyze problems with the physical ADSL or VDSL line.

Wait at least one minute after using the `diagnostic linktrace set` command before using the `diagnostic linktrace show` command.

The following example performs loop diagnostics on DSL port 5 of the line card in slot 2.

The command then displays the results of the VDSL port loop diagnostics.

```
ras> diagnostic linktrace show 2-5
```

## 25.4.3 diagnostic cfm linktrace set Command

This enables the MEP port (with the specified MEP ID) in a specified CFM domain to send the LTMs (Link Trace Messages) to a specified remote end point.

Specify the MD name, MA name, MEP ID, destination (MEP ID or MAC address) to perform a link trace test.

Syntax:

`diagnostic cfm linktrace set <md-name> <ma-name> <ep-id> <remote-ep-id>|<mac> <ttl>`

where

| | | |
|---|---|---|
| *md-name* | = | The maintenance domain name (length<32). |
| *ma-name* | = | The maintenance association name (length<16) |
| *ep-id* | = | The endpoint identifier (1~8191). |
| *remote-ep-id* | = | The remote endpoint identifier used to resolve the remote MAC address in the CCM database. |
| *mac* | = | An arbitrary unicast MAC address. |
| *ttl* | = | This is Time-To-Live value (1~63 seconds). Sets this to stop a test once it exceeds the time duration without receiving any response. |

## 25.4.4 diagnostic ldm show Command

Syntax:

`diagnostic ldm show <slot-port> result|hlin|hlog|qln|snr`

where

| | | |
|---|---|---|
| `result` | = | Displays the basic loop diagnostic mode test results. |
| `hlin` | = | Displays the channel characteristics function represented in linear format by a scale factor and a complex number. These are the maximum upstream and downstream scale factors used in producing the channel characteristics function. |
| `hlog` | = | Displays channel characteristics. The format provides magnitude values in a logarithmic scale. This can be used in analyzing the physical condition of the ADSL or VDSL line. |
| `qln` | = | Displays the Quiet Line Noise for a DMT tone is the rms (root mean square) level of the noise present on the line, when no ADSL or VDSL signals are present. It is measured in dBm/Hz. The QLN can be used in analyzing crosstalk. |
| `snr` | = | Displays the upstream and downstream Signal to Noise Ratio (in dB). A DMT tone's SNR is the ratio between the received signal power and the received noise power. The SNR can be used in analyzing time dependent changes in crosstalk levels and line attenuation (such as those caused by temperature variations and moisture). |

Use this command to display the most recent loop diagnostic mode test results for an ADSL or VDSL port. Use the loop diagnostics results to analyze problems with the physical ADSL or VDSL line.

Wait at least one minute after using the `diagnostic ldm test` command before using the `diagnostic ldm show` command.

The following example performs loop diagnostics on DSL port 4 of the line card in slot 5.

The command then displays the results of the ADSL port loop diagnostics.

```
ras> diagnostic ldm show 5-4 result
port 5-4:
                              near end      far end
                            ------------  ------------
  attainable bit rate(kpbs):         1420         26060
  loop attenuation(dB)     :          1.6           0.0
  signal attenuation(dB)   :          0.5           0.0
  snr margin(dB)           : out of range  out of range
  actual tx power fe(dBm)  :         11.7          10.1
```

## 25.4.5 diagnostic ldm test Command

Syntax:

`diagnostic ldm test <slot-port>`

This command has the system perform a Loop Diagnostic Mode test. This is a Dual End Loop Test (DELT). It provides details about the condition of the line on the specified ADSL or VDSL port. The ADSL port must be set to ADSL, ADSL2 or ADSL2+ operational mode and have a connection. The VDSL port must be set to VDSL2, ADSL2 or ADSL2+ operational mode and have a connection. Use the loop diagnostics results to analyze problems with the physical ADSL or VDSL line. The subscriber device must also support DELT in order to perform this. This feature is applicable for ALC or VLC line cards only.

It takes about one minute for the loop diagnostics to finish.

The following example performs loop diagnostics on DSL port 4 of the line card in slot 2. The command then displays the results of the DSL port loop diagnostics.

```
ras> diagnostic ldm test 2-4
```

### 25.4.6 diagnostic loopback f5 Command

Syntax:

`diagnostic loopback f5 <slot-port-vpi/vci>`

This command has the system perform an OAMF5 loopback test on the specified virtual circuit. An Operational, Administration and Maintenance Function 5 (OAMF5) test is used to test the connection between two DSL devices. First, the DSL devices establish a virtual circuit. Then the local device sends an ATM F5 cell to be returned by the remote DSL device (both DSL devices must support ATM F5 in order to use this test).

The following example has the system perform a local loopback test on a virtual circuit on DSL port 5 of the line card in slot 7. The virtual circuit is identified by VPI 0 and VCI 33.

```
ras> diagnostic loopback f5 7-5-0/33
line 1 oam loopback success!
```

### 25.4.7 diagnostic loopback internal Command

This command performs a loopback test on the specified DSL port.

The following example performs loopback diagnostic on DSL port 5 of the line card in slot 2.

The command then displays the results of the DSL port loop diagnostic.

```
ras> diagnostic loopback internal 2-5
test succeeded
```

## 25.5 diagnostic mlt test Commands

Use these commands to perform a variety of standard Metallic Line Tests on the VoIP line card subscriber ports.

## 25.5.1 diagnostic mlt test Command

Syntax:

`diagnostic mlt test <slot-port> all|vac|vdc|rload|riso|cap|ren|ring|metering [force]`

where

| | | |
|---|---|---|
| `all` | = | Perform all tests on the line connected to the specified VoIP line card port. |
| `vac` | = | Test the line's AC voltage only. |
| `vdc` | = | Test the line's DC voltage only. |
| `rload` | = | Test the line's load resistance only |
| `riso` | = | Test the line's isolation resistance only. |
| `cap` | = | Test the line's capacitance only. |
| `ren` | = | Test the line's ringer equivalent number only. |
| `ring` | = | Test the line's ring voltage only. |
| `metering` | = | Test the line's metering voltage only. |
| `force` | = | Perform the test(s) immediately, even if the specified VoIP line card port is in use. |

This command performs a variety of standard Metallic Line Tests on the specified VoIP line card connection.

The following example tests the REN of the line connected to port 8 of slot 4.

```
ras> diagnostic mlt test 4-8 ren
```

## 25.5.2 diagnostic mlt show Command

Syntax:

`diagnostic mlt show <slot-port>`

This command displays the results of the last Metallic Line Test that was run on the specified VoIP line card port.

The following example shows the result of the last test conducted on the line connected to port 8 of slot 4.

```
ras> diagnostic mlt show 4-8
```

## 25.5.3 diagnostic mlt relay set Command

Syntax:

`diagnostic mlt relay set <slot-port> in|out|both|off`

where

| | | |
|---|---|---|
| `in` | = | Allows diagnostic inner loop tests to be initiated by an external device on this port. |
| `out` | = | Allows diagnostic outer loop tests to be initiated by an external device on this port. |
| `both` | = | Allows both inner and outer loop diagnostic tests to be initiated by an external device on this port. |
| `off` | = | Disables diagnostic testing through the line card on this port. |

This command turns the test relay function on or off on the specified port. When the test relay function is on, you can run tests using diagnostic equipment connected to the **TEST IN** and **TEST OUT** ports. When the test relay function is off, you cannot run line tests. Test relay functions are off by default.

The following example allows diagnostic testing (both directions) on port 8 of slot 4.

```
ras> diagnostic mlt relay set 4-8 both
```

### 25.5.4 diagnostic mlt relay show Command

Syntax:

`diagnostic mlt relay show`

This command shows the test relay conditions of all VoIP line card ports. Test relay functions are off by default.

## 25.6 diagnostic selt Commands

Use these commands to perform Single End Loop Tests on subscriber ports.

### 25.6.1 diagnostic selt show Command

Syntax:

`diagnostic selt show <slot>|<slot-port>`

This command displays the Single End Loop Test (SELT) result after you have performed a SELT test on the specified port on the line card. The report tells you what gauge of telephone wire is connected to the port and the approximate length of the line measured both in meters (m) and thousands of feet (Kft).

### 25.6.2 diagnostic selt test Command

Syntax:

`diagnostic selt test <slot-port>`

This command starts the Single End Loop Test (SELT) on the specified port on the line card. This test checks the distance to the subscriber's location.

The port must have an open loop. There cannot be a DSL device, phone, fax machine or other device connected to the subscriber’s end of the telephone line.

# 26

# ip Commands

This chapter shows you how to use the `ip` commands to configure the IP (Internet Protocol) parameters.

The ip commands are for management purposes, rather than for user traffic.

## 26.1 ip Commands Summary

The following table lists the `ip` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 231** ip Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `ip` | `arp` | `flush` | | Clears the device's IP Address Resolution Protocol (ARP) table. | M |
| | | `show` | | Displays the device's IP ARP table. | L |
| | `gateway` | `<ip-address>` | | Sets the default gateway IP address. | M |
| | `ping` | `<ip-address> [<count>]` | | Pings a host (default 3 times)<br>`count`: number of pings. | L |
| | `route` | `delete` | `<dst-ip>[/<netmask>] <gateway-ip>` | Removes a routing table entry. | M |
| | | `set` | `<dst-ip>[/<netmask>] <gateway-ip> [<metric>] [<name>]` | Adds or modifies a route entry.<br>`gateway-ip`: a gateway IP address of '0.0.0.0/0' means a default gateway. | M |
| | | `show` | | Displays the routing table. | L |
| | `show` | | | Displays the IP addresses of the in-band and out-of-band management interfaces and the default gateway, as well as the in-band management VLAN ID. | L |

**Table 231** ip Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | set | inband\|outband <*ip-address*>[/<*netmask*>] [<*inband-vid*>] | | Sets the management IP address, subnet mask and in-band management VLAN ID.<br>*ip-address*: '0.0.0.0' disables a management interface.<br>*inband-vid*: The VLAN ID for this interface. | M |
| | tracert | <*ip-address*> | | Sends a traceroute packet to the IP address (in the field to the left) and uses the response to determine the path a packet takes to that IP address. | L |

# 26.2 ip Commands

The following shows general IP commands that help with the management of the IP parameters.

## 26.2.1 ip arp flush Command

Syntax:

```
ras> ip arp flush
```

This command clears the system's IP Address Resolution Protocol (ARP) table.

## 26.2.2 ip arp show Command

Syntax:

```
ras> ip arp show
```

This command displays the system's IP Address Resolution Protocol (ARP) table. This is the list of IP addresses and matching MAC addresses that the device has resolved.

An example is shown next.

```
ras> ip arp show
ip address       time ether address     interface
---------------- ----- ----------------- ----------
123.23.14.65       300 00:00:86:47:11:91 outband
123.23.15.172      300 02:0e:a6:89:41:60 outband
123.23.15.254      300 00:04:80:9b:78:00 outband
arp entry: 3
```

## 26.2.3 ip gateway Command

Syntax:

```
ras> ip gateway <ip-address>
```

This command sets the system's default gateway IP address.

The following example sets the system to use 123.23.15.254 as the default gateway.

```
ras> ip gateway 123.23.15.254
```

## 26.2.4 ip ping Command

Syntax:

`ras> ip ping <ip-address> [<count>]`

where

| | | |
|---|---|---|
| `<ip-address>` | = | The IP address of the target. |
| `[<count>]` | = | The number of pings you want the system to send. |

This is an IP facility to check for network functionality by sending an echo request to another IP host and waiting for the reply.

The following example has the system send 4 pings to IP address 123.23.19.254.

```
ras> ip ping 123.23.19.254 4
pinging 123.23.19.254 with 32 bytes of data:

reply from 123.23.19.254: bytes=32 time<1ms
reply from 123.23.19.254: bytes=32 time<1ms
reply from 123.23.19.254: bytes=32 time<1ms
reply from 123.23.19.254: bytes=32 time<1ms
```

## 26.2.5 ip route delete Command

Syntax:

`ras> ip route delete <dst-ip>[/<netmask>] <gateway>`

where

| | | |
|---|---|---|
| `<dst ip>` | = | The destination IP address of packets to which this static route applies. |
| `[/netmask]` | = | The destination subnet mask of packets to which this static route applies. |
| `<gateway>` | = | The IP address of the gateway that you want to send the packets through. |

This command removes a static, IP forwarding route.

The following example removes a static route for destination IP address 123.23.19.233 through a gateway at IP address 123.23.15.253.

```
ras> ip route delete 123.23.19.233 123.23.15.253
```

## 26.2.6 ip route set Command

Syntax:

`ras> ip route set <dst-ip>[/<netmask>] <gateway-ip> [<metric>] [<name>]`

where

| | | |
|---|---|---|
| <*dst ip*> | = | The destination IP address of packets that this static route is to route. |
| [/<*netmask*>] | = | The destination subnet mask of packets that this static route is to route. |
| <*gateway-ip*> | = | The IP address of the gateway that you want to send the packets through. |
| [<*metric*>] | = | The metric (hop count) of this static route. |
| [<*name*>] | = | A name to identify this static route. Up to 31 English keyboard characters. Spaces and tabs are not allowed. |

This command defines a new, static IP forwarding route or edits an existing one.

The following example creates a static route named “statroute1” to send traffic for destination IP address 123.23.19.233 through a gateway at IP address 123.23.15.253.

```
ras> ip route set 123.23.19.233 123.23.15.253 statroute1
```

## 26.2.7 ip route show Command

Syntax:

```
ras> ip route show
```

This command displays the system’s routing table. An example is shown next.

```
ras> ip route show
dest               interface  gateway         metric name
------------------ ---------- --------------- ------ ----------------
123.23.15.0/24     outband    123.23.15.86         1 -
123.23.19.233      outband    123.23.15.253        5 statroute1
192.168.1.0/24     inband     192.168.1.2          1 -
default            outband    123.23.15.254        1 -
```

## 26.2.8 ip show Command

Syntax:

```
ras> ip show
```

Use the command to display the current management IP settings. An example is shown next.

```
ras> ip show
interface   interface ip     netmask       vid
--------- --------------- --------------- ----
inband    192.168.1.2     255.255.255.0      1
outband   123.23.15.86    255.255.255.0      -
gateway: 123.23.15.254
```

## 26.2.9 ip set Command

Syntax:

```
ras> ip set inband|outband <ip-address>[/<netmask>] [<inband-vid>]
```

where

| | | |
|---|---|---|
| *inband* | = | Sets the in-band management IP address. |
| *outband* | = | Sets the out-of-band management IP address (for the **MGMT** port). |
| [<*inband-vid*>] | = | Sets the VLAN ID (Identifier) of the management (CPU) VLAN. You must connect to the system through a port that is a member of the management (CPU) VLAN in order to perform in-band management. |

This command sets the system's IP addresses and in-band management VLAN (CPU). You can only manage the system through ports that are members of the management VLAN.

By default, you can access the management VLAN from all of the IES's in-band ports since they are all in the management VLAN. If you need more security, please see the following example.

### 26.2.9.1 Configuring Management VLAN Example

After the following example configuration, you must connect through the third Ethernet port (uplink port 1) in order to perform inband management. You must connect through a VLAN aware device that is using the proper VLAN ID in order to perform management.

Another option would be to set the PVID of the third Ethernet port to 3, but this is not recommended since all Ethernet frames received on the port without a VLAN tag would be considered part of VLAN 3.

By default, the DSL ports are members of the management VLAN (VID 1). The following procedure shows you how to configure a tagged VLAN that limits management access to just one Ethernet port.

Use the out-of-band management port or console port to configure the system if you misconfigure the management VLAN and lock yourself out from performing in-band management.

1. Use the `vlan set` command to configure a VLAN ID (VID 3 in this example) for managing the system (the "management" or "CPU" VLAN).

```
ras> vlan set 3 up1 fix tag
ras> vlan enable 3
```

**2** Use the `ip set` command to set VID 3 as the management VLAN.

```
ras> ip set inband 192.168.1.2 3
```

## 26.2.10 ip tracert Command

Syntax:

`ras> ip tracert <ip-address>`

This command sends a traceroute packet to the IP address (in the field to the left) and uses the response to determine the path a packet takes to that IP address.

The following example displays route information to an Ethernet device with an IP address of 123.23.19.11.

```
ras> ip tracert 123.23.19.11
Resolving 123.23.19.11... traceroute to 123.23.19.11 (123.23.19.11), 30 hops
max
, 40 byte packet
  1:123.23.14.254  (0 ms) (0 ms) (0 ms)
  2:123.23.19.11  (0 ms) (0 ms) (0 ms)
traceroute done:
```

# 27

# lcman Commands

This chapter shows you how to use the `lcman` commands to manage the line cards.

## 27.1 lcman Commands Summary

The following table lists the `lcman` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 232** lcman Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `lcman` | `disable` | `<slot>` | | Turns off the specified line card. | H |
| | `enable` | `<slot>` | | Turns on the specified line card. | H |
| | `reset` | `<slot>` | | Performs a hardware reset on the specified line card. | H |
| | `show` | `[<slot>]` | | Displays information about the installed cards. | L |

## 27.2 lcman Commands

Use the lcman (line card manager) commands to manage the line cards.

### 27.2.1 lcman enable Command

Syntax:

```
lcman enable <slot>
```

This command turns on the management of the specified line card. This also restarts the line card.

The following example turns on the line card in slot 7.

```
ras> lcman enable 7
```

### 27.2.2 lcman disable Command

Syntax:

```
lcman disable <slot>
```

This command turns off the management of the specified line card. This command is for troubleshooting.

The system can automatically restart a line card that it is managing. If a line card is unresponsive and the `lcman reset` command does not help, you may need to use `lcman disable` before connecting to the line card's console port and recovering the firmware. Do this to keep the system from turning the line card off during your firmware recovery.

The following example turns off the line card in slot 7.

```
ras> lcman disable 7
```

## 27.2.3 lcman reset Command

Syntax:

`lcman reset <slot>`

This command performs a hardware reset on the specified line card. You can use this on an unresponsive line card.

The following example resets the line card in slot 7.

```
ras> lcman reset 7
```

## 27.2.4 lcman show Command

Syntax:

`lcman show [<slot>]`

This command displays information about the line cards in the system. This information includes how many slots are under management, and the type of line card the MSC1000G is managing in each slot (if any), as well as the line card's uptime, firmware version and any alarms.

The following example shows an overview of all of the cards that are installed in the system's slots.

```
ras> lcman show
id state    card type          uptime f/w version         heat vol mon down out
-- -------- ----------- ------------- ------------------- ---------------------
 1 standby  MSC1000G         01:36:48 V3.70(LU.0)           -   -   -    -   -
 2 active   MSC1000G         23:45:55 V3.70(LU.0)           -   -   -    -   -
 3 -                                                        -   -   -    -   -
 4 -        ALC1248G-53               V3.70(ABE.0)         -   -   -    V   V
 5 active   ALC1248G-53      22:45:41 V3.53(ABE.0)         -   -   -    -   -
 6 -                                                        -   -   -    -   -
 7 -        ALC1248G-51               V3.70(ABD.0)         -   -   -    V   V
 8 -                                                        -   -   -    -   -
 9 -        ALC1248G-53               V3.53(ABE.0)         -   -   -    V   V
10 -        ALC1248G-53               V3.53(ABE.0)         -   -   -    V   V
```

The following table describes labels in the example.

**Table 233** lcman show Command

| LABEL | DESCRIPTION |
|---|---|
| id | This is the slot number. |
| state | This displays whether or not the installed card is turned on. |
| card type | This identifies the model of card that is installed or was last installed in the slot. |
| uptime | This is how long the card has been active. |
| f/w version | This is the release of firmware that the card is using. |
| | The following columns display a “V” if an alarm has been detected. “-” displays if no related alarm has been detected. |
| heat | This displays whether or not there is an alarm due to the card’s temperature being too high or too low. |
| vol | This displays whether or not there is an alarm due to the card’s voltage being too high or too low. |
| mon | This displays whether or not the hardware monitor sensor has failed. |
| down | This displays whether or not the installed card is down (inactive). |
| out | This displays whether the card is installed or has been removed. |

The following example shows information about the line card installed in slot 1.

```
ras> lcman show 1

slot1 SLC1248G-22:

 uptime: 01:33:24

 status:
   hardware sensor: ok
   temperature    : ok
   voltage        : ok
   module exist   : ok
   module status  : ok

 inventory information:
   hardware version: AA
   hardware serial number: Z51854282
   firmware version: V3.70(ABF.0)b5 | 11/07/2006
   DSL driver version: 0.9.1.0
   DSL modem version: 1.1-1.5.0__004

 current voltage level:   current temperature:
     1.8V:  1.777            Temp1: 37.000
     3.3V:  3.320            Temp2: 41.000
    15.0V: 14.961            Temp3: 38.000
 '*' indicates a current alarm
```

The following table describes labels in the example.

**Table 234** lcman show Command: Detailed Information

| LABEL | DESCRIPTION |
|---|---|
| slot | This is the slot number followed by the model of card that is installed or was last installed in the slot. |
| uptime | This is how long the card has been active. |
| f/w version | This is the release of firmware that the card is using. |
| status | The following columns display a “V” if an alarm has been detected. “-” displays if no related alarm has been detected. |
| hardware sensor | This displays the condition of the card’s hardware monitor sensor. |
| temperature | This displays whether or not the card’s measured temperature is within the configured operating thresholds. |
| voltage | This displays whether or not the card’s measured current is within the configured operating thresholds. |
| module exist | This displays whether or not the card is installed. |
| module status | This displays whether or not the installed card is up (active). |
| hardware version | This is the version of the card’s physical hardware. |
| hardware serial number | This is the card’s individual identification number assigned at the factory. |
| firmware version | This is the release of firmware that the card is using. |
| DSL driver version | This is the driver version that a DSL line card’s DSL chip is using. |
| DSL modem version | This is the release of modem code that a DSL line card is using. |
| current voltage level | These are the voltages (in volts) measured at the card’s sensors. An “*” indicates the voltage is outside of the configured thresholds. |
| current temperature | These are the temperatures (in degrees Celsius) measured at the card’s sensors. An “*” indicates the temperature is outside of the configured thresholds. |

# 28

# multicast Commands

This chapter shows you how to use the `multicast` commands.

## 28.1 multicast Commands Summary

The following table lists the `multicast` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 235** multicast Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `multicast` | `bandwidth` | `default` | *<bandwidth>* | Sets the default bandwidth (1 ~100 000 kbps) allowed for multicast channel(s) for which you have not set the bandwidth settings. | M |
| | | `delete` | *<index>* | Removes the specified multicast bandwidth configuration. | M |
| | | `port` | `disable` *<slot-port>* | Deactivates multicast bandwidth setting on a port. | M |
| | | | `enable` *<slot-port>* | Activates multicast bandwidth setting on a port. | M |
| | | | `set` *<slot-port>* *<bandwidth>* | Sets the maximum multicast bandwidth allowed on a port. | M |
| | | | `show` *<slot>*`\|`*<slot-port>* | Displays multicast bandwidth settings on the specified line card or port. | L |
| | | `set` | *<index>* *<start-mcast-ip>* *<end-mcast-ip>* *<bandwidth>* | Sets bandwidth allowed for the specified multicast channel(s). | M |
| | | `show` | | Displays multicast bandwidth settings on the device. | L |
| | `igmp` | `disable` | | Turns off IGMP proxy or snooping. | M |
| | | `enable` | `proxy\|snooping [v2\|v3]` | Turns on IGMP proxy or snooping using the specified version. | M |

**Table 235** multicast Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | `fastleave` | `enable` | Enables IGMP fast leave to allow the system to remove a port from a multicast group once a leave message is received and the fast leave timer expires. In IPTV application, this feature allows users to quickly switch between video channels. | M |
| | | | `disable` | Disables IGMP fast leave. | M |
| | | | `timer <`*`timer`*`>` | Specifies the time the device has to leave a multicast group.<br>*`timer`*: The time duration (0~256 seconds) | M |
| | | `mode` | `<aggressive\|normal>` | Sets the way how this Device handles IGMP join/leave reports sent from subscribers to uplink devices when it cannot find a "query port". A query port is the port the Device uses for IGMP queries' receiving and IGMP reports' forwarding from/to its uplink router.<br>The device drops those IGMP reports in the normal mode while it floods those reports to all uplink ports in the aggressive mode.<br>Note: Use the aggressive mode when you bridge the Device with others in an RSTP ring | M |
| | | `qryvid` | `delete` | Removes a VLAN ID in the IGMP proxy query VLAN table.<br>Use these `qryvid` commands only when IGMP proxy is enabled. (You can use the `multicast igmp qryvid enable proxy` command to turn IGMP proxy on.) | M |
| | | | `set <`*`vid`*`>` | Adds a static VLAN ID in the IGMP proxy query VLAN table. | M |
| | | | `show` | Displays the VLAN IDs in the IGMP proxy query VLAN table. | L |
| | | `show` | | Displays the IGMP mode (proxy, snooping or disabled) and version (v2 or v3). | M |
| | `igmpcount` | `disable` | `<`*`slot-port`*`>` | Turns off the IGMP count limit for a DSL port(s). | M |
| | | `enable` | `<`*`slot-port`*`>` | Turns on the IGMP count limit for a DSL port(s). | M |
| | | `set` | `<`*`slot-port`*`> <`*`count`*`>` | Sets the IGMP count limit for a DSL port(s). | M |
| | | `show` | `<`*`slot`*`>` | Displays the IGMP count limit setting status for the specified slot. | L |

**Table 235** multicast Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | igmpfilter | set | <*slot-port*> <*igmpfilter*> | Sets the DSL port(s) to use in an IGMP filter profile.<br>*igmpfilter*: The name of an IGMP filter profile configured using the profile IGMP commands. | M |
| | | show | <*slot*> | Displays multicast group configuration and dynamic group member status. | L |
| | igmpmsgcount | disable | <*slot-port*> | Disables limiting the number of IGMP control messages allowed to flow through the specified slot and port. | M |
| | | enable | <*slot-port*> | Enables limiting the number of IGMP control messages allowed to flow through the specified slot and port. | M |
| | | set | <*slot-port*> <*count*> | Sets the number of IGMP control messages allowed to flow through the specified slot and port.<br>*count*: The number of IGMP control messages allowed per second. | M |
| | | show | <*slot*>\|<*slot-port*> | Displays IGMP control message statistics for the specified slot or port. | L |
| | mvlan | delete | <*vid*> | Removes a multicast VLAN. | M |
| | | disable | <*vid*> | Deactivates a multicast VLAN. | M |
| | | enable | <*vid*> | Activates a multicast VLAN. | M |
| | | group | delete <*vid*> <*index*> | Removes a multicast VLAN group. | M |
| | | | set <*vid*> <*index*> <*start-mcast-ip*> <*end-mcast-ip*> | Sets a multicast VLAN group. | M |
| | | name | <*name*> | Sets the name of the multicast VLAN setting. | M |
| | | set | <*vid*> <*slot-port*> fix\|forbid | Sets the port multicast group membership settings.<br>fix: Set the port to be part of the specified MVLAN.<br>forbid: Disallow the port from joining the specified MVLAN. | M |
| | | show | <*vid*> | Displays multicast VLAN settings. | L |
| | smcast | delete | <*vid*> <*group-ip*> | Removes a static multicast group entry. | M |

**Table 235** multicast Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | set | <*vid*> <*group-ip*> all\|sub1\|sub2\|up1\|up2\|<*slot-port*> fix\|forbid\|normal | Configures a static multicast group entry. | M |
| | | show | | Displays the static multicast group configuration. | L |

# 28.2 multicast bandwidth Commands

Use these commands to configure bandwidth requirements for multicast channels.

## 28.2.1 multicast bandwidth default Command

Syntax:

`multicast bandwidth default <bandwidth>`

where

<*bandwidth*> = Allowed bandwidth between 1 and 1000 000 kbps (kilo bits per second).

This command sets the default bandwidth for multicast channels for which you have not configured bandwidth requirements yet. Multicast bandwidth settings on channels (using the `multicast bandwidth set` command) have higher priority over this default setting.

The following example sets the default multicast bandwidth to 1000 kbps.

```
ras> multicast bandwidth default 1000
```

## 28.2.2 multicast bandwidth delete Command

Syntax:

`multicast bandwidth delete <index>`

This command removes the specified multicast bandwidth configuration profile.

## 28.2.3 multicast bandwidth set Command

Syntax:

`multicast bandwidth set <index> <start-mcast-ip> <end-mcast-ip> <bandwidth>`

where

| | | |
|---|---|---|
| *<index>* | = | A unique number for this setting. |
| *<start-mcast-ip>* | = | The start of the multicast address range. |
| *<end-mcast-ip>* | = | The end of the multicast address range. For one multicast address, enter the start multicast address again. |
| *<bandwidth>* | = | Allowed bandwidth between 1 and 1000 000 kbps (kilo bits per second). |

This command configures bandwidth allocation for the multicast channel(s). For multicast channel(s) for which you have not configured bandwidth settings, the default multicast bandwidth setting applies (refer to Section 28.2.1 on page 512).

The following example sets the bandwidth allowed for the specified multicast channels to 1000 Kbps.

```
ras> multi band set 1 230.230.1.1 230.230.1.10 1000
```

# 28.3 multicast bandwidth port Commands

Use these commands to configure multicast bandwidth limitation on specified ports.

## 28.3.1 multicast bandwidth port disable Command

Syntax:

`multicast bandwidth port disable <slot-port>`

This command deactivates multicast bandwidth settings of the specified port.

## 28.3.2 multicast bandwidth port enable Command

Syntax:

`multicast bandwidth port enable <slot-port>`

This command activates multicast bandwidth setting on the specified port.

## 28.3.3 multicast bandwidth port set Command

Syntax:

`multicast bandwidth port set <slot-port> <bandwidth>`

This command sets the bandwidth allowed for multicast traffic on the specified port(s).

This following example sets the multicast bandwidth limit to 1000 kbps on port 1 on the line card in slot 3.

```
ras> multicast bandwidth port set 3-1 1000
```

After using this command, if the device receives a join report and the total multicast traffic at that moment is over 1000 kbps, the device ignores the join report.

### 28.3.4 multicast bandwidth port show Command

Syntax:

`multicast bandwidth port show <slot|slot-port>`

This command displays the multicast bandwidth setting on the specified port. The following example shows the multicast bandwidth setting for port 1 on the line card in slot 2.

```
ras> multicast bandwidth port show 2-1
 port  enable   bandwidth
------ ------ -----------
 2- 1     V    1024
```

## 28.4 multicast fastleave Commands

Use these commands to enable the multicast fastleave feature on the system. This allows the system to immediately remove a port from a multicast group when a leave message is received and the fastleave timer expires. In IPTV applications, this feature allows users to quickly switch between video channels.

### 28.4.1 multicast igmp fastleave enable Command

Syntax:

`multicast igmp fastleave enable`

This command activates multicast fastleave on the system.

### 28.4.2 multicast igmp fastleave disable Command

Syntax:

`multicast igmp fastleave disable`

This command deactivates multicast fastleave on the system.

### 28.4.3 multicast igmp fastleave timer Command

Syntax:

`multicast igmp fastleave timer`

This command sets the time a device has to leave a multicast group.

The following example specifies 10 seconds as the time the device has to leave a multicast group.

```
ras> multicast igmp fastleave timer 10
```

# 28.5 multicast igmp Commands

Use these commands to enable or disable IGMP proxy or IGMP snooping.

## 28.5.1 multicast igmp disable Command

Syntax:

```
multicast igmp disable
```

This command deactivates IGMP on the system. All IGMP packets will be ignored.

## 28.5.2 multicast igmp enable Command

Syntax:

```
multicast igmp enable proxy|snooping [v2|v3]
```

This command turns on IGMP proxy or snooping using the specified version.

Use proxy to have the device use IGMP proxy. Use IGMP snooping to have the DSLAM passively learn multicast groups.

If you use IGMPv2, the system discards IGMPv3 packets. This provides better security if none of the devices in the network use IGMPv3. If you select IGMPv3, the system recognizes both IGMPv2 and IGMPv3.

The following example sets the device to use IGMP proxy with IGMPv2.

```
ras> multicast igmp enable proxy v2
```

## 28.5.3 multicast igmp qryvid delete Command

Syntax:

```
multicast igmp qryvid delete <vid>
```

This command removes an IGMP query VLAN ID. The following example removes IGMP query VLAN ID 6.

```
ras> multicast igmp qryvid delete 6
```

## 28.5.4 multicast igmp qryvid set Command

Syntax:

```
ras> multicast igmp qryvid set <vid>
```

This command adds an IGMP query VLAN ID. When using IGMP proxy mode, the device sends IGMP queries to the members of the specific VLANs. You can use this command to define which VLANs the device sends queries only. You must have already used the `vlan` commands to create the VLAN before you use this command.

The following example sets VLAN ID 6 as an IGMP query VLAN.

```
ras> multicast igmp qryvid set 6
```

### 28.5.5 multicast igmp qryvid show Command

Syntax:

```
ras> multicast qryvid show
```

This command displays the IGMP query VLAN IDs.

```
ras> multicast igmp qryvid show
igmp proxy query vlan table
vid  static/dynamic
---- --------------
   6 static
```

### 28.5.6 multicast igmp show Command

Syntax:

```
ras> multicast igmp show
```

This command displays the current IGMP settings. The following shows an example.

```
ras> multicast igmp show
proxy is enabled
mode is normal
igmp version is v3
igmp leave time: 0 sec
igmp fast leave: enable
```

## 28.6 IGMP Count Limit

With the IGMP count feature, you can limit the number of IGMP groups a subscriber on a port can join. This allows you to control the distribution of multicast services (such as content information distribution) based on service plans and types of subscription.

IGMP count is useful for ensuring the service quality of high bandwidth services like video or Internet Protocol television (IPTV). IGMP count can limit how many channels (IGMP groups) the subscriber connected to a DSL port can use at a time. If each channel requires 4~5 Mbps of download bandwidth, and the subscriber's connection supports 11 Mbps, you can use IGMP count to limit the subscriber to using just 2 channels at a time. This also effectively limits the subscriber to using only two IPTVs with the DSL connection.

## 28.7 multicast igmpcount Commands

Use these commands to configure the IGMP count limit settings.

### 28.7.1 multicast igmpcount disable Command

Syntax:

```
multicast igmpcount disable <slot-port>
```

This command turns off the IGMP count limit for the specified DSL port(s).

The following command turns off the IGMP count limit for DSL port 4 on the line card in slot 3.

```
ras> multicast igmpcount disable 3-4
```

## 28.7.2 multicast igmpcount enable Command

Syntax:

`multicast igmpcount enable <slot-port>`

This command turns on the IGMP count limit for the specified DSL port(s).

The following command turns on the IGMP count limit for DSL port 4 on the line card in slot 3.

```
ras> multicast igmpcount enable 3-4
```

## 28.7.3 multicast igmpcount set Command

Syntax:

`multicast igmpcount set <slot-port> <count>`

This command sets the IGMP count limit for the specified DSL port(s).

The following command sets a IGMP count limit of 2 for DSL port 4 on the line card in slot 3.

```
ras> multicast igmpcount set 3-4 2
```

## 28.7.4 multicast igmpcount show Command

Syntax:

`multicast igmpcount show <slot>`

This command displays the IGMP count limit setting status for the DSL ports on the line card in the specified slot. The following example displays the IGMP count limit settings for the ports on the line card in slot 3.

```
ras> multicast igmpcount show 3
[slot9] igmpcount
 port enable count
----- ------ -----
 3- 1   -        5
 3- 2   -        5
 3- 3   -        5
 3- 4   -        5
 3- 5   -        5
 3- 6   -        5
-------------------------- [snip] --------------------------
 3-44   -        5
 3-45   -        5
 3-46   -        5
 3-47   -        5
 3-48   -        5
```

# 28.8 multicast igmpfilter Commands

Use the IGMP filter commands to define IGMP filter profiles and assign them to DSL ports.

IGMP filter profiles allow you to control access to IGMP multicast groups. You can have a service available to a specific IGMP multicast group. You can configure an IGMP filter profile for an IGMP multicast group that has access to a service (like a SIP server for example). Then you can assign the IGMP filter profile to DSL ports that are allowed to use the service.

## 28.8.1 multicast igmpfilter set Command

Syntax:

`switch igmpfilter set <slot-port> <igmpfilter>`

where

`<igmpfilter>` = The name of an IGMP filter profile.

This command sets an ADSL port(s) to use an IGMP filter profile.

The following example sets ADSL port 9 in slot 7 to use the `voice` IGMP filter profile.

```
ras> multicast igmpfilter set 7-9 voice
```

## 28.8.2 multicast igmpfilter show Command

Syntax:

`multicast igmpfilter show <slot>`

This command displays which IGMP filter profile DSL ports are using.

The following example displays which IGMP filter profiles the DSL ports in slot 3 are using.

```
ras> multicast igmpfilter show 3
<<slot3 igmpfilter configuration>>
port igmpfilter
---- ------------------------------
   1 DEFVAL
   2 DEFVAL
   3 DEFVAL
   4 DEFVAL
   5 DEFVAL
   6 DEFVAL
   7 DEFVAL
   8 DEFVAL
   9 DEFVAL
------------------------- [snip] -------------------------
  44 DEFVAL
  45 DEFVAL
  46 DEFVAL
  47 DEFVAL
  48 DEFVAL
```

# 28.9 multicast igmpmsgcount Commands

Use these commands to limit the number of IGMP control messages allowed to flow through the specified slot and port.

## 28.9.1 multicast igmpmsgcount disable Command

Syntax:

`multicast igmpmsgcount disable <slot-port>`

This command disables limiting the number of IGMP control messages allowed to flow through the specified slot and port.

## 28.9.2 multicast igmpmsgcount enable Command

Syntax:

`multicast igmpmsgcount enable <slot-port><count>`

This command enables limiting the number of IGMP control messages allowed to flow through the specified slot and port.

The following example enables limiting of the number of IGMP control messages on port number 2 on the line card in slot 5.

```
ras> multicast igmpmsgcount enable 5-2
```

### 28.9.3 multicast igmpmsgcount set Command

Syntax:

`multicast igmpmsgcount set <slot-port><count>`

This command sets the number of IGMP control messages allowed to flow through the specified slot and port.

The following example sets the number of IGMP control messages to 10 on port number 2 on the line card in slot 5.

```
ras> multicast igmpmsgcount set 5-2 10
```

### 28.9.4 multicast igmpmsgcount show Command

Syntax:

`multicast igmpmsgcount show <slot>|<slot-port>`

This command displays IGMP control message statistics for the specified slot and/or port.

The following example displays the number of IGMP control messages permitted per second on the line card in slot 5.

```
ras> multicast igmpmsgcount show 5
port  enable count
----- ------ -----
 5- 1   V       10
 5- 2   V       10
 5- 3   -        8
 5- 4   -        8
```

## 28.10 multicast mvlan Commands

Use these commands to configure VLAN multicast settings and set multicast port members.

Multicast VLAN allows one single multicast VLAN to be shared among different subscriber VLANs on the network. This improves bandwidth utilization by reducing multicast traffic in the subscriber VLANs and simplifies multicast group management.

### 28.10.1 multicast mvlan delete Command

Syntax:

`multicast mvlan delete <vid>`

This command removes the specified multicast VLAN configuration.

### 28.10.2 multicast mvlan disable Command

Syntax:

`multicast mvlan disable <vid>`

This command deactivates the specified multicast VLAN. The following example disables multicast VLAN 12.

```
ras> multicast mvlan disable 12
```

## 28.10.3 multicast mvlan enable Command

Syntax:

`multicast mvlan enable <vid>`

This command activates the specified multicast VLAN.

## 28.10.4 multicast mvlan group delete Command

Syntax:

`multicast mvlan group delete <vid> <index>`

This command removes the specified multicast VLAN group setting.

## 28.10.5 multicast mvlan group set Command

Syntax:

`multicast mvlan group set <vid> <index> <start-mcast-ip> <end-mcast-ip>`

where:

| | | |
|---|---|---|
| *<index>* | = | Multicast group number (1 -16). |
| *<start-mcast-ip>* | = | Start of the multicast IP address range. |
| *<end-mcast-ip>* | = | End of the multicast IP address range. |

This command creates a multicast VLAN group. The following example creates a multicast VLAN with VID 10 and group index 1. The multicast address range is 224.224.224.1 ~ 224.224.224.10.

```
ras> multicast mvlan group set 10 1 224.224.224.1 224.224.224.10
```

## 28.10.6 multicast mvlan group delete Command

Syntax:

`multicast mvlan group delete <vid> <index>`

This command removes the specified multicast VLAN group configuration.

## 28.10.7 multicast mvlan name Command

Syntax:

`multicast mvlan name <vid> <name>`

This command sets the name of the multicast VLAN. The following example sets the name of the multicast VLAN (VID =10) to "example".

```
ras> multicast mvlan name 10 example
```

## 28.10.8 multicast mvlan set Command

Syntax:

`multicast mvlan set <vid> <slot-port> fix|forbid`

where

`fix|forbid` = `fix`: Sets the port to be a permanent member of this multicast VLAN.
`forbid`: Blocks the port from joining this multicast VLAN. The port will not accept multicast traffic from this multicast VLAN.

This command sets a multicast VLAN and the allowed/blocked port member(s).

The following example creates a multicast VLAN (VID =10) and sets port 1 on the line card in slot 3 to be a member of this multicast VLAN.

```
ras> multicast mvlan set 10 3-1 fix
```

## 28.10.9 multicast mvlan show Command

Syntax:

`multicast mvlan show [vid]`

This command displays the current multicast VLAN settings. In the state column, "-" indicates the multicast VLAN is not active while "V" indicates the multicast VLAN is active.

```
ras> multicast mvlan show
idx vid  state name
--- ---- ----- ------------------------------
  1   10   V   example
  2   12   -
ras>
```

# 28.11 multicast smcast Commands

Use the following multicast commands to manage static multicast groups.

## 28.11.1 multicast smcast delete Command

Syntax:

`multicast smcast delete <vid> <group-ip>`

where

| | | |
|---|---|---|
| <*group-ip*> | = | A multicast IP address. |

This command removes a static multicast group entry.

The following example removes a static multicast group for VLAN 23 with static multicast address 239.255.255.255.

```
ras> multicast smcast delete 23 239.255.255.255
```

## 28.11.2 multicast smcast set Command

Syntax:

`multicast smcast set <vid> <group-ip> all|sub1|sub2|up1|up2|<slot-port> fix|forbid|normal`

where

| | | |
|---|---|---|
| <*group-ip*> | = | A multicast IP address. |
| `all\|sub1\|sub2\|up1\|up2\|`<*slot-port*> | = | The port or ports to which this static multicast group is to apply. |
| `fix\|forbid\|normal` | = | This controls the static multicast group membership status of the port (or ports).<br>`fix:` Sets the port to be a permanent member of the multicast group.<br>`normal:` Allows the port to join the multicast group when the device adds it through IGMP protocol.<br>`forbidden:` Prohibits the port from joining the multicast group. |

This command configures a static multicast group entry.

The following example creates a static multicast group for VLAN 23. The static multicast address is 239.255.255.255 and DSL port 9 in slot 7 is a permanent member.

```
ras> multicast smcast set 23 239.255.255.255 7-9 fix
```

## 28.11.3 multicast smcast show Command

Syntax:

```
multicast smcast show
```

This command displays the system's static multicast group configuration.

An example is shown next.

```
ras> multicast smcast show
vid  group           slot         port(F:fix, X:forbid, -:normal)
---- --------------- ---- ------------------------------------------------
   1 224.0.0.0                     1         2         3         4
                         12345678901234567890123456789012345678901234567890
                       1 XXXX
                       2 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                       3 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                       4 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                       5 ------------------------------------------------

    Press any key to continue, 'e' to exit
ras>
```

# 29

# port Commands

This chapter shows you how to use the `port` commands.

## 29.1 General port Command Parameters

The following table describes commonly used `port` command parameter notation.

**Table 236** General port Command Parameters

| NOTATION | DESCRIPTION |
|---|---|
| *alarmprofile* | The name of an alarm profile configured using the `profile alarm` commands. |
| *registration* | Specify whether a port joins (`join`) or leaves (`leave`) a VLAN. |
| *tag* | The VLAN tag. Options are `tag` or `untag`. |
| *slot-port-vpi/vci*: | The card inserted in a slot, a port on that line card, and the vpi/vci settings for the DSL line connected to that port, for example,: `3-1-0/33`. |
| *option_mask* | This is used to configure DSL connection settings.<br>Option bit map, 0x0000~0x0400.<br>`0x0001`: disables Trellis coding in ADSL mode<br>`0x0002`: disables Reed-Solomon coding for ADSL<br>`0x0004`: disables upstream 1-bit constellation support<br>`0x0008`: disable downstream bitswap<br>`0x0010`: disable 1-bit constellation<br>`0x0020`: disables the transmit windowing in ADSL2+ mode<br>`0x0040`: disables S=0.5 support in G.dmt.<br>`0x0080`: disable G.lite rate limit (G.lite only)<br>`0x0200`: enables ADSL2 Annex L.<br>`0x0400`: enables ADSL2+ Annex M. |

## 29.2 port Commands Summary

The following table lists the `port` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 237** port Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| port | adsl | alarmprof | <*slot-port*> <*alarmprofile*> | Applies an ADSL alarm profile to the subscriber port. | M |
| | | annexl | disable <*slot-port*> | Turns off the Annex L reach extended feature. | M |
| | | | enable <*slot-port*> [narrow] | Turns on the Annex L reach extended feature. If 'narrow' is not specified then Annex L mode will be enabled in 'wide' PSD mode. | M |
| | | annexm | disable <*slot-port*> | Turns off the Annex M double upstream feature. | M |
| | | | enable <*slot-port*> | Turns on the Annex M double upstream feature (upstream tones from 6 to 63). | M |
| | | annexi | disable <*slot-port*> | Turns off the Annex I all digital mode feature. | M |
| | | | enable <*slot-port*> | Turns on the Annex I all digital mode feature. | M |
| | | dscarrier0 | <slot-port> <m1> <m2> <m3> <m4> <m5> <m6> <m7> | Disables downstream carrier tones from 33 to 255.<br>m1~m7: carrier tones, 0~ffffffff,<br>'1' disables the corresponding tone. | M |
| | | dscarrier1 | <*slot-port*> <m1> <m2> <m3> <m4> <m5> <m6> <m7> | Disables downstream carrier tones from 256 to 511.<br>m1~m7: carrier tones, 0~ffffffff,<br>'1' disables the corresponding tone. | M |
| | | inpmin | <*slot-port*> <*us_inp*> <*ds_inp*> | Sets the upstream and downstream Impulse Noise Protection minimum setting<br>*us_inp*: The minimum upstream impulse noise protection setting (0~6).<br>*ds_inp*: The minimum downstream impulse noise protection setting (0~6). | M |
| | | optionmask | <*slot-port*> <*option_mask*> | Sets option mask attributes on a line card port. | M |
| | | pmm | disable <*slot-port*> | Turns off the power management mode. | M |
| | | | enable <*slot-port*> [L2\|L3] | Turns on the power management mode.<br>L2: power management mode L2<br>L3: power management mode L2 and L3 | M |

**Table 237** port Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | | param <*slot-port*> [l0time <*l0time*>] [l2time <*l2time*>] [l2pcb <*l2atpr*> <*l2atprt*>] [l2rate <*l2minrate*> <*l2maxrate*> <*l2threshold*>] | Sets the L0 (full power) and L2 (low power) power mode transition settings.<br>*l0time*: Time (10~ 65535 seconds) to stay in L0 mode.<br>*l2time*: Time (10~65535 seconds) to wait before performing another power trims in L2 mode.<br>*l2atpr*: Maximum aggregated power reduction (APTR) per trim in dB (0~l2atprt).<br>*l2atprt*: Maximum total aggregate power reduction in dB (0~15).<br>*l2minrate*: Minimum rate in L2 (32~4096).<br>*l2maxrate*: Maximum rate in L2 (minimum L2 rate ~ maximum upstream rate in kbps).<br>*l2threshold*: Line rate threshold to stay in L2 mode. When the rate is not within the threshold, the port switches to L0 mode immediately. | M |
| | | power | <*slot-port*> fix\|power\|rate <*max_us_tx*> <*max_ds_tx*> <*max_rx*> | Specifies the maximum allowed transmission power and maximum aggregate received power.<br>fix\|power\|rate: PSD and power adaptivity:<br>fix: fixed mode<br>power: priority to power<br>rate: priority to rate<br>*max_us_tx*: maximum upstream transmission power (-130~200 in 0.1 dBm).<br>*max_ds_tx*: maximum downstream transmit power (-50~200 in 0.1 dBm).<br>*max_rx*: maximum aggregate receive power at atu-c (-255~255 in 0.1 dBm). | M |
| | | psd | maximum [<*slot-port*> <*us-psd*> <*ds-psd*>] | Sets/displays maximum upstream/ downstream nominal PSD values. This is for testing purposes.<br>*us-psd*: Upstream PSD (-400 ~ 40 in 0.1dBm/Hz).<br>*ds-psd*: Downstream PSD (-400 ~ 40 in 0.1dBm/Hz). | M |
| | | set | <*slot-port*> <*profile*> <*mode*> | Sets ADSL port(s) to use a profile created by the profile adsl set command.<br>mode:<br>for Annex A, choose gdmt, t1413, glite, auto, adsl2, or adsl2+.<br>for Annex B, choose gdmt, etsi, auto, adsl2, or adsl2+. | M |
| | | uscarrier | <*slot-port*> <m0> <m1> | Disables upstream carrier tones from 0 to 63.<br>m0,m1: carrier tones, 0~ffffffff, '1' disables the corresponding tone. | M |

**Table 237** port Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | copy | <source> <destination> | | Copies port settings from a source port to destination ports on the same type of line card. | M |
| | disable | <slot-port> | | Turns off a subscriber port. | M |
| | enable | <slot-port> | | Turns on a subscriber port. | M |
| | enet | bandwidth | *<slot-port>* *<ingress-rate>* *<egress-rate>* | Sets the incoming or outgoing bandwidth control for the specified Ethernet (ELC) subscriber port(s) (0~99968 Kbps).<br>*ingress-rate*: The incoming bandwidth rate on a port.<br>*egress-rate*: The outgoing bandwidth rate on a port. | M |
| | | dot3ad | aggport *<slot-port>* t1\|t2\|…\|t10\|none | Creates a link aggregation trunk group for Ethernet (ELC) subscriber ports. | M |
| | | | disable *<slot>* t1\|t2\|…\|t10 | Turns off link aggregation on the specified subscriber port trunk group. | M |
| | | | enable *<slot>* t1\|t2\|…\|t10 [lacp] | Turns on link aggregation on the specified subscriber port trunk group. lacp turns on LACP protocol. | M |
| | | | show *<slot>* | Displays Ethernet (ELC) subscriber port link aggregation settings. | L |
| | | flowctrl | disable *<slot-port>* | Turns off flow control on an Ethernet (ELC) subscriber port. | M |
| | | | enable *<slot-port>* | Turns on flow control on Ethernet (ELC) subscriber port. | M |
| | | frametype | *<slot-port>* all\|tag | Sets the Ethernet (ELC) subscriber port(s) to accept VLAN tagged and untagged Ethernet frames or only tagged. | M |
| | | priority | *<slot-port>* *<priority>* | Sets the Ethernet subscriber port(s) priority (0~7). 0 is the lowest priority level and 7 is the highest. | M |
| | | pvid | *<slot-port>* *<vid>* | Sets the port VID on the Ethernet subscriber port(s). | M |
| | | show | *<slot-port>* | Displays the settings of the specified Ethernet subscriber port(s). | L |
| | | tls | disable *<slot-port>* | Disables Transparent LAN Service (TLS) on the specified Ethernet subscriber port(s). The system does not insert additional VLAN tags to packets. | M |
| | | | enable *<slot-port>* | Turns on TLS to insert additional VLAN tags to packets. | M |
| | | | set *<slot-port>* *<svid>* *<spriority>* | Sets/changes TLS settings on the specified Ethernet subscriber port(s).<br>*svid*: The service provider VLAN ID.<br>*spriority*: The service provider IEEE 802.1p priority setting. | M |

**Table 237** port Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | | show <*slot-port*> | Displays the TLS settings of the specified Ethernet subscriber port(s). | L |
| | | vlan | <*slot-port*> <*vid*> <*registration*> <*tag*> | Sets the VLAN attributes of the specified Ethernet subscriber port(s). | M |
| | gbond | delete | <*slot*> <*bond_name*> | Removes G.bond settings from the DSL lines specified in the G.bond group.<br>*bond_name*: The name of a DSL line group with G.bond configured on them. | M |
| | | set | set <*slot*> <*bond_name*> <*portlist*> | Configures a G.bond group or modifies the membership of a G.bond group.<br>*portlist*: A list of ports, for example, (1,2), (5~7).<br>Note: G. bond on ADSL (ALC line cards) lines only supports pairs of consecutive ports (1, 2), (3, 4) and so on up to (47, 48).<br>Note: G. bond on SHDSL lines (for example, the SLC1248G line card) supports multiple ports in any combination. | M |
| | | show | <*slot*> [<*bond_name*>] | Shows G.bond settings on the specified port. | L |
| | h248 | set | <*slot-port*> <*mg-name*> [<*dsp-profile*>] | Configures the DSP (Digital Sound Processing) profile for the specified subscriber port on the specified media gateway (MG).<br>dsp-profile**:** The DSP profile name (<=32 characters). | M |
| | | termination | <*slot-port*> <*name*> | Specify the termination name of an MG port.<br>*name***:** MG termination name (<=32 characters). | M |
| | ipbpvc | arpproxy | flush all \|edgerouter [<*ip-address*> <*vid*>] \|interface [<*ip/mask*> <*vid*>] | Manually flushes the learned MAC addresses from the ARP table. | M |
| | | | age set <*sec*> | Sets the valid time interval for learned MAC addresses in the ARP table (10~10000 seconds) | M |
| | | | show | Displays the number of seconds a learned MAC address remains valid in the ARP table. | M |
| | | delete | <*slot-port-vpi/vci*> | Removes the specified IP aware Bridge PVC. | M |

**Table 237** port Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | domain | delete <*domain-name*> | Removes the specified domain. First delete all VLANs belonging to this domain. | M |
| | | | dhcpvlan disable <*domain name*> | Disables DHCP VLAN in a domain. | M |
| | | | dhcpvlan enable <*domain name*> <*vid*> | Enables DHCP VLAN in a domain. | M |
| | | | set <*domain name*> | Creates a domain with maximum 8 domains in the system. | M |
| | | | show[<*domain name*>] | Displays domain settings. | L |
| | | | vlan <*domain name*> <*vid*> <*registration*> | Sets a VLAN to join or leave a specified domain with maximum 8 VLANs in one domain. | M |
| | | edgerouter | delete <*ip-address*> <*vid*> | Deletes the specified edge router settings. | M |
| | | | set <*ip-address*>/<*mask*> <*vid*> | Sets the edge router. | M |
| | | | show [<*vid*>] | Displays the edge router settings. | L |
| | | interface | delete <*ip-address*>/<*mask*> <*vid*> | Deletes an IP interface. | M |
| | | | set <*ip-address*>/<mask> <*vid*> [<*slot-port-vpi/vci*>] | Sets the interface. | M |
| | | | show all\|<*ip/mask*>\|<*vid*>\|<*ip/mask*> <*vid*> | Displays interface settings, including IP address, subnet mask and VLAN ID settings if specified. | L |
| | | route | delete <*domain-name*> <*ip/mask*> <*nexthop*> | Deletes a route entry from specified domain.<br>*nexthop*: This is the IP address of the edge router or gateway device for this route. | M |
| | | | set <*domain-name*> <*ip/mask*> <*nexthop*> <*metric*> [<*priority*>] | Sets a new route to the specified edge router for a given domain. Maximum 16 routes in a domain.<br>*nexthop*: This is the IP address of the edge router or gateway device for this route.<br>*metric*: This is the number of hops in a route.<br>*priority:* This is the VLAN priority tag inserted into a VLAN frame which uses this route. | M |
| | | | show [<*domain name*> \| <*ip/mask*> \| <*domain*> <*ip/mask*>] | Displays the current routing table for the specified domain. | L |

**Table 237** port Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | set | <*slot-port-vpi/vci*> <*profile*> <*vid*> <*priority*> <*type*> | Sets an IP aware Bridge PVC.<br>*type*: The connection type. Options are llc, vc, llc_r, vc_r. | M |
| | | show | <*slot*>\|<*slot-port*>\|<*slot-port-vpi/vci*> | Displays IP aware Bridge PVC settings. | L |
| | | vlan | <*slot-port-vpi/vci*> <*vid*> <*registration*> <*tag*> | Sets the VLAN attributes of a PVC. | M |
| | name | <slot-port> <name> | | Sets a name for a subscriber port. | M |
| | paepvc | delete | <*slot-port-vpi/vci*> | Removes a PAE PVC (PPPoA-to-PPPoE PVC). | M |
| | | set | <*slot-port-vpi/vci*> <*profile*> <*mux*> <*pvid*> <*priority*> [acname <*acname*>] [srvcname <*srvcname*>] [hellotime <*hellotime*>] | Configures a PVC for PAE translation.<br>acname: The host name of the access concentrator.<br>srvcname: A descriptive name for the service that uses this PVC.<br>hellotime: The timeout (0~600 seconds) for the PPPoE session.<br>Note: Make sure the VID is not already used for MVLAN or TLS PVC. | M |
| | | show | <*slot*>\|<*slot-port*>\|<*slot-port-vpi/vci*> | Displays the PAE PVC settings for the specified port and/or slot. | L |
| | pots | impedance | <*slot-port*> <*impedance*> | Sets the impedance level on the specified subscriber port.<br>*impedance*: 200ohm_680ohm_100nf, 220ohm_680ohm_100nf, 220ohm_820ohm_115nf, 220ohm_820ohm_120nf, 270ohm_750ohm_150nf, 300ohm_1000ohm_220nf, 370ohm_620ohm_310nf, 600ohm, 600ohm_1000nf, 900ohm, 900ohm_2160nf and DEFVAL<br>**Note: DEFVAL impedance is set at the impedance of the country defined in the countrycode command.** | |

**Table 237** port Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | pots | gain | <*slot-port*> <*tx-gain*> <*rx-gain*> | Sets the amount of gain (increase in volume) to apply to the signal the subscriber transmits (tx) or the signal the subscriber receives (rx). (-200~200 in 0.1 dB).<br>A negative value decreases the volume. | M |
| | ppvc | delete | <*slot-port-vpi/vci*> | Removes a priority-based PVC. | M |
| | | member | delete <*slot-port-vpi/vci*> <*vpi/vci*> | Removes a PVC channel from a PVC group. | M |
| | | | set <*slot-port-vpi/vci*> <*vpi/vci*> <*atmprofile*> <*priority*> | Adds a priority-PVC into the group.<br>*atmprofile*: Specify the ATM profile using profile atm commands. | M |
| | | set | <*slot-port-vpi/vci*> <*mux*> <*pvid*> <*priority*> | Creates a priority-based PVC. | M |
| | | show | <*slot*>\|<*slot-port*>\|<*slot-port-vpi/vci*> [*detail*] | Displays runtime configured virtual channels. | L |
| | | vlan | <*slot-port-vpi/vci*> <*vid*> <*registration*> <*tag*> | Adds a PVC channel to a VLAN. | M |
| | pvc | delete | <*slot-port-vpi/vci*> | Removes a PVC (Permanent Virtual Circuit). | M |
| | | mvlan | disable <*slot-port-vpi/vci*> | Deactivates multicast VLAN on the PVC. | M |
| | | | enable <*slot-port-vpi/vci*> | Activates the multicast VLAN in the PVC. | M |
| | | pvlan | delete <*slot-port-vpi/vci*> <*etype*> | Deletes a protocol VLAN setting on a specified DSL port. | M |
| | | | set <*slot-port-vpi/vci*> <*etype*> <*vid*> <*priority*> | Deletes a protocol VLAN on a specified DSL port. | M |
| | | set | <*slot-port-vpi/vci*> <*profile*> <*mux*> <*pvid*> <*priority*> | Creates or modifies a PVC setting.<br>*profile*: The asynchronous transfer mode (ATM) profile. Specify the ATM profile using profile atm commands. | M |
| | | show | <*slot*>\|<*slot-port*>\|<*slot-port-vpi/vci*> [detail] | Displays runtime configured virtual channels. | L |
| | | usratelimit | enable <*pvc*> | Activates upstream rate limiting on the PVC. | M |
| | | | disable <*pvc*> | Deactivates upstream rate limiting on the PVC. | M |
| | | | set <*pvc*> <*rate*> | Sets the maximum upstream rate (in Kbps) the PVC is allowed to use. | M |

**Table 237** port Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | | show <*pvc*> | Displays upstream rate limiting settings. | L |
| | | vlan | <*slot-port-vpi/vci*> <*vid*> <*registration*> <*tag*> | Adds a PVC channel to a VLAN. | M |
| | shdsl | alarmprof | <*slot-port*> span\|stuc\|stur\|* <*alarmprofile*> | Sets SHDSL ports or end point(s) to use an alarm profile.<br>span: set alarm profile for the whole span<br>stuc: set alarm profile at stuc end point<br>stur: set alarm profile at stur end point<br>*: set alarm profile at both stuc and stur | M |
| | | pbo | <*slot-port*> normal_epl\|forced_epl\|forced_no_epl <*value*> | Sets power backoff for SHDSL port(s).<br>normal_epl: Power backoff with EPL (Estimated Power Loss).<br>forced_epl: Forced power backoff with EPL.<br>forced_no_epl: Forced power backoff without EPL.<br>*value*: 0~31 in dB. | M |
| | | pmms | <*slot-port*> <*mode*> | Sets the negotiated noise margin mode of the SHDSL port(s).<br>*mode*: The negotiated noise margin mode, options are normal or forced | M |
| | | set | <*slot-port*> <*profile_name*> | Sets SHDSL port(s) to use a profile created by the profile shdsl set command. | M |
| | show | <*slot*>\|<*slot-port*> [*dsl*\|*pvc*\|*vlan*] | | Displays port settings.<br>slot: Specifies the slot of a line card (not MSC1000G's slot).<br>*dsl*: Displays a port's DSL settings.<br>*pvc*: Displays a port's PVC settings.<br>*vlan*: Displays a port's VLAN settings. | L |
| | sip | set | <*slot-port*> <*sip-profile*> <*svc-profile*> [<*dsp-profile*>] | Sets a port on a VoIP line card to use the specified SIP, SVC and DSP profiles.<br>*sip-profile*: SIP or dial plan profile name (<=32 characters).<br>*svc-profile*: Call service profile name, (<=32 characters).<br>*dsp-profile*: DSP profile name, (<=32 characters). | M |
| | sip | opmode | <*slot-port*> <DEFVAL\|v5sip> | Use this command to specify the operation mode of a VoIP port.<br>DEFVAL: configure the port to use SIP to connect to a server.<br>v5sip: configure the port to use V5.2 to connect to a traditional class 5 POTS switch. | M |
| | tel | <slot-port> <telephone-no> | | Records a port(s) subscriber's telephone number. | M |

**Table 237** port Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | `tlspvc` | `delete` | `<slot-port-vpi/vci>` | Removes a TLS (Transparent LAN Service) on the PVC. | M |
| | | `set` | `<slot-port-vpi/vci> <profile> llc\|vcmux <vid> <priority>` | Sets/changes TLS PVC settings. | M |
| | | `show` | `<slot>\|<slot-port>\|<slot-port-vpi/vci>` | Displays the settings for a TLS PVC. | L |
| | `vdsl` | `alarmprof` | `<slot-port> <profile>` | Sets the VDSL port(s) to use the specified alarm profile. | M |
| | | `frametype` | `<slot-port> <all\|tag>` | Sets the acceptable frame type on the VDSL port(s). | M |
| | | `ipqos` | `<slot-port> <profile>` | Configures QoS (quality of service) settings on a line card's port.<br>*profile*: The IP QOS profile specified using the `profile ipqos` command. | M |
| | | `frequencyplan` | `<slot-port> <997\|998>` | Sets the band plan the VDSL port(s) uses. | M |
| | | `inpmin` | `<slot-port><us-inp> <ds-inp>` | Configures impulse noise protection settings on a VDSL connection.<br>*us-inp, ds-inp*: The upstream and downstream impulse noise protection setting. Input 0~160 to set the DMT level to 0.1 of the input value. For example, an input value of 10 sets the actual DMT value to 1. Input values 1~4 (0.1~0.4 DMT) are not valid. | M |

**Table 237** port Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | limitmask set | <*slot-port*> <*limitmask* | Configures the PSD (Power Spectrum Density) mask.<br>*limitmask*:<br>1: VDSL2_A_NUS0<br>2~11: VDSL2_A_EU[32,36,40,44,48,52,56,60,64,128]<br>12: VDSL1_FTTEX_ANSI_M1<br>13: VDSL1_FTTEX_ANSI_M2<br>14: VDSL1_FTTCAB_ANSI_M1<br>15: VDSL1_FTTCAB_ANSI_M2<br>16: VDSL1_FTTEX_ANSI_M1_e<br>17: VDSL1_FTTEX_ANSI_M2_e<br>18: VDSL1_FTTCAB_ANSI_M1_e<br>19: VDSL1_FTTCAB_ANSI_M2_e<br>20: VDSL2_A_CT<br>21~36: VDSL2_B8_[1..16]<br>37~46: VDSL2_B7_[1..10]<br>47: VDSL2_BT_ANFP<br>48: VDSL2_C_138_b<br>49: VDSL2_C_276_b<br>50: VDSL2_C_138_co<br>51: VDSL2_C_276_co<br>Four additional customer-defined PSD shapes can be configured per system. | M |
| | | optionmask | <*slot-port*> <*option-mask*> | Sets the advanced DSL physical layer settings for optional band on a VDSL port | M |
| | | priority | <*slot-port*> <*priority*> | Sets the VDSL port(s) VLAN priority (0~7). 0 is the lowest priority level and 7 is the highest. | M |
| | | pvid | <*slot-port*> <*vid*> | Sets the port VID on the VDSL port(s). | M |
| | | pvlan | delete <*slot-port*> <*etype*> | Deletes a protocol VLAN setting on a specified port. | M |
| | | | set <*slot-port*> <*etype*> <*vid*> <*priority*> | Sets the protocol VLAN settings on a specified port. | M |
| | | rfiband | <*slot-port*> <disable\|ansi\|etsi\|custom> | Selects an RFI band or disables this feature. | M |
| | | rficustom | disable <*index*> | Displays the settings of a custom RFI entry. | M |
| | | | enable <*index*> | Activates the specified custom RFI entry. | M |
| | | | set <*index*> <*start_freq*> <*stop_freq*> | Sets a custom RFI entry.<br>*index*: 1~8<br>*start_freq*: The start of the frequency range in kHz. *start_freq* cannot be bigger than *stop_freq*.<br>*stop_freq*: end of the frequency range in kHz. | M |
| | | | show | Displays custom RFI settings. | L |

**Table 237** port Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | tls | disable <*slot-port*> | Disables Transparent LAN Service (TLS). The system does not insert additional VLAN tags to packets. | M |
| | | | enable <*slot-port*> | Turns on Transparent LAN Service (TLS) to insert additional VLAN tags to packets. | M |
| | | | set <*slot-port*> <*svid*> <*spriority*> | Sets/changes TLS settings on the VDSL port(s).<br>*svid*: The service provider VLAN ID.<br>*spriority*: The service provider IEEE 802.1p priority setting. | M |
| | | upbo | enable | Enables the Upstream Power Back Off (UPBO) feature. | **M** |
| | | | disable | Disables the Upstream Power Back Off (UPBO) feature. | **M** |
| | | | param <*slot-port*> <a0> <b0> <a1> <b1> [<a2> <b2> | *ai*: UPBO Ai parameter for USi (-20725~-10240 in 1/256 dBm/Hz).<br>*bi*: UPBO Bi parameter for USi (-10485~0 in 1/256 dBm/Hz). | **M** |
| | | | forceelength <*slot-port*> <*value*> | *value*: Range (0~1270 in 0.1 dB). A negative value means no electric length will be performed. | **M** |
| | | vlan | <*slot-port*> <*vid*> <*registration*> <*tag*> | Sets the VLAN setting on the VDSL port(s). | M |

# 29.3 port Commands

Use the `port` commands to configure the line card ports.

# 29.4 port adsl Commands

Use the `port adsl` commands to configure the subscriber ADSL ports.

## 29.4.1 port adsl alarmprof Command

Syntax:

`port adsl alarmprof <slot-port> <alarmprofile>`

where

<*alarmprofile*> = The name of an ADSL alarm profile.

This command applies (maps) an ADSL alarm profile to the subscriber port(s).

The following example sets ADSL port 5 on the line card in slot 7 to use the SESalarm alarm profile.

```
ras> port adsl alarmprofile 7-5 SESalarm
```

## 29.4.2 port adsl annexl disable Command

Syntax:

`port adsl annexl disable <slot-port>`

This command turns off the Annex L reach extended feature on the specified ADSL2 port(s).

The following example turns off the Annex L feature for port 5 on the line card in slot 75.

```
ras> port adsl annexl disable 5-7
```

## 29.4.3 port adsl annexl enable Command

Syntax:

`port adsl annexl enable <slot-port> [narrow]`

where

| | | |
|---|---|---|
| `[narrow]` | = | The “narrow” PSD (Power Spectral Density) mode. The narrow mode supports longer loop lengths but has lower transmission speeds.<br>The “wide” PSD mode is used if you do not enter “narrow”. The wide mode supports higher transmission speeds but requires shorter loop lengths. |

This command turns on the Annex L reach extended feature on the specified ADSL2 port(s). Annex L can be used with Annex A (ADSL over POTS), not Annex B (ADSL over ISDN).

The following example turns on the Annex L feature for port 7 on the line card in slot 5.

```
ras> port adsl annexl enable 5-7
```

## 29.4.4 port adsl annexm disable Command

Syntax:

`port adsl annexm disable <slot-port>`

This command turns off the Annex M double upstream feature on the specified ADSL2/2+ port(s).

The following example turns off the Annex M feature for port 5 on the line card in slot 7.

```
ras> port adsl annexm disable 7-5
```

## 29.4.5 port adsl annexm enable Command

Syntax:

`port adsl annexm enable <slot-port>`

This command turns on the Annex M double upstream feature on the specified ADSL2/2+ port(s). This has the upstream connection use tones 6 to 63.

The following example turns on the Annex M feature for port 5 on the line card in slot 7.

```
ras> port adsl annexm enable 7-5
```

## 29.4.6 port adsl annexi disable Command

Syntax:

`port adsl annexi disable <slot-port>`

This command turns off the Annex I all digital mode feature on the specified ADSL2/2+ port(s).

The following example turns off the Annex I feature for port 5 on the line card in slot 7.

```
ras> port adsl annexi disable 7-5
```

## 29.4.7 port adsl annexi enable Command

Syntax:

`port adsl annexi enable <slot-port>`

This command turns on the Annex I all digital mode feature on the specified ADSL2/2+ port(s). With Annex I, the ADSL connection uses the full spectrum of the physical line and the user can not use POTS or ISDN service.

The following example turns on the Annex I feature for port 5 on the line card in slot 7.

```
ras> port adsl annexi enable 7-5
```

## 29.4.8 port adsl dscarrier0 Command

Syntax:

`port adsl dscarrier0 <slot-port> <m1> <m2> <m3> <m4> <m5> <m6> <m7>`

where

| | | |
|---|---|---|
| <m1> ~ <m7> | = | The downstream carrier tones to be disabled. Each <mx> can use up to 8 hexadecimal digits (0~ffffffff). Each *<mx>* represents 32 carrier tones (each hexadecimal digit represents 4 tones).<br>*m1*: tones 32~63<br>*m2*: tones 64~95<br>*m3*: tones 96~127<br>*m4*: tones 128~159<br>*m5*: tones 160~191<br>*m6*: tones 192~223<br>*m7*: tones 224~255<br>The hexadecimal digit is converted to binary and a '1' disables the corresponding tone. Disabling a carrier tone turns it off so the system does not send data on it. |

This command disables downstream carrier tones from 33 to 255 on the specified ADSL port(s). Use this command to have the system not use an ADSL line's tones that are known to have a high noise level.

The following example disables downstream carrier tone 89 for ADSL port 5 on the line card in slot 7.

```
ras> port adsl dscarrier0 7-5 0 01000000 0 0 0 0 0
```

This example disables downstream carrier tones 89 and 90 for ADSL port 5 on the line card in slot 7.

```
ras> port adsl dscarrier0 7-5 0 03000000 0 0 0 0 0
```

## 29.4.9 port adsl dscarrier1 Command

Syntax:

`port adsl dscarrier1 <slot-port> <m0> <m1> <m2> <m3> <m4> <m5> <m6> <m7>`

where

| | | |
|---|---|---|
| <m0> ~ <m7> | = | The downstream carrier tones to be disabled. Each <mx> can use up to 8 hexadecimal digits (0~ffffffff). Each <mx> represents 32 carrier tones (each hexadecimal digit represents 4 tones).<br>*m0*: tones 256~287<br>*m1*: tones 288~319<br>*m2*: tones 320~351<br>*m3*: tones 352~383<br>*m4*: tones 384~415<br>*m5*: tones 416~447<br>*m6*: tones 448~479<br>*m7*: tones 480~511<br>The hexadecimal digit is converted to binary and a '1' disables the corresponding tone. Disabling a carrier tone turns it off so the system does not send data on it. |

This command disables downstream carrier tones from 256 to 511 on the specified ADSL2+ port(s). Use this command to have the system not use an ADSL line's tones that are known to have a high noise level.

The following example disables downstream carrier tone 301 for ADSL2+ port 5 on the line card in slot 7.

```
ras> port adsl dscarrier1 7-5 0 00001000 0 0 0 0 0 0
```

The following example disables downstream carrier tones 301 to 304 for ADSL2+ port 5 on the line card in slot 7.

```
ras> port adsl dscarrier1 7-5 0 0000f000 0 0 0 0 0 0
```

## 29.4.10 port adsl inpmin Command

Syntax:

`port adsl inpmin <slot-port> <us_inp> <ds_inp>`

where

| | | |
|---|---|---|
| *<us_inp>* | = | Sets the minimum upstream (us) impulse noise protection setting. Use 0~6 to define a number of DMT symbols. 0 = 0, 1 = 0.5, 2 = 1, 3 = 2, 4 = 4, 5 = 8, 6 = 16 DMT symbols |
| *<ds_inp>* | = | Sets the minimum downstream (ds) impulse noise protection setting (0~6). |

This command sets the minimum upstream (us) and downstream (ds) impulse noise protection setting on the specified ADSL port(s). Sudden spikes in the line's noise level (impulse noise) can cause errors and result in lost packets. Set the impulse noise protection minimum to have a buffer to protect the ADSL physical layer connection against impulse noise. This buffering causes a delay that reduces transfer speeds. It is recommended that you use a non-zero setting for real time traffic that has no error correction (like videoconferencing).

The following example sets the impulse noise protection minimum to 2 DMT symbols for upstream and 4 DMT symbols for downstream for ADSL port 5 on the line card in slot 7.

```
ras> port adsl inpmin 7-5 3 4
```

## 29.4.11 port adsl optionmask Command

Syntax:

`port adsl optionmask <slot-port> <option_mask>`

where

| | | |
|---|---|---|
| <*option_mask*> | = | 0x0001: Disables Trellis<br>Trellis encoding helps to reduce the noise in ADSL transmissions. Trellis may reduce throughput but it makes the connection more stable.<br>0x0002: Disables Reed-Solomon<br>Reed-Solomon performs transmission error correction.<br>0x0004: Disables upstream bitswap<br>0x0008: Disables downstream bit swap<br>Bit swapping allows the system to respond to noise on a tone by sending it's data on another tone. The subscriber (ATU-R) equipment must also support this in order for it to work.<br>0x0010: Disables 1-bit constellation<br>1-bit constellation allows the system to send individual bits over DMT tones that can only support one bit. This allows the connection to use as many of the tones as possible.<br>0x0020: Disables transmit windowing (ADSL2+ only)<br>0x0040: Disables s=0.5 support option in G.dmt.<br>0.5 support maps two Reed-Solomon codewords into one data frame (instead of one) to increase the maximum G.dmt transmission rate.<br>0x0080: Disables G.lite rate limit (G.lite only).<br>Disabling the G.lite rate limit allows the G.lite upstream transmission rate to be greater than 512 Kbps. |

This command masks (turns off) attributes for the specified port(s). It is for advanced troubleshooting. Use an entry with a "1" instead of "0" before the "x" in order to turn the attribute back on (remove the option mask).

The following example sets ADSL port 5 on the line card in slot 7 to not use Trellis encoding.

```
ras> port adsl optionmask 7-5 0x0001
```

## 29.4.12 port adsl pmm disable Command

Syntax:

`port adsl pmm disable <slot-port>`

This command turns off the Power ManageMent (PMM) feature on the specified ADSL2/2+ port(s).

The following example sets ADSL2+ port 5 on the line card in slot 7 to not use power management.

```
ras> port adsl pmm disable 7-5
```

## 29.4.13 port adsl pmm enable Command

Syntax:

`port adsl pmm enable <slot-port> [L2|L3]`

where

| | | |
|---|---|---|
| L2 | = | Power management mode L2. This is a power saving mode that scales back the power usage to where there is just enough to support the transmission rate that the subscriber is using. |
| L3 | = | Power management mode L2 and L3. Power management mode L3 is a power saving mode that puts the ADSL connection to sleep when there is no traffic. The connection comes back up within three seconds when there is traffic. |

This command turns on the Power ManageMent (PMM) feature on the specified ADSL2/2+ port(s). This reduces the amount of power used overall and reduces the instances of the connection going down. PMM increases or decreases the transmission power based on line conditions.

The following example sets ADSL2+ port 5 on the line card in slot 7 to use power management.

```
ras> port adsl pmm enable 7-5
```

## 29.4.14 port adsl power Command

Syntax:

`port adsl power <slot-port> fix|power|rate <max_us_txpwr> <max_ds_txpwr> <max_rxpwr>`

where

| | | |
|---|---|---|
| `fix\|power\|rate` | = | The PSD (Power Spectral Density) and power adaptivity mode.<br>`fix`: Fixed mode sets the maximum downstream transmit power to the number you specify (`<max_ds_txpwr>`).<br>`power`: Power mode gives the saving of transmission power priority over the transmission rate. The line card attempts to reduce its transmit power as much as possible while still maintaining the configured minimum rate. This only applies to the downstream connection and the ADSL operational mode must be G.dmt, ANSI T1.413 or G.lite.<br>`rate`: Rate mode gives the transmission rate priority over the saving of transmission power. The line card attempts to achieve the maximum configured transmission rate before reducing the transmit power. |
| *<max_us_txpwr>* | = | Maximum upstream transmit power, -130~200 in 0.1 dBm. |
| *<max_ds_txpwr>* | = | Maximum downstream transmit power, -50~200 in 0.1 dBm. |
| *<max_rxpwr>* | = | Maximum aggregate receive power at atu-c, -255~255 in 0.1 dBm.This only applies to the ADSL2/2+ ADSL operational modes. |

This command specifies the maximum allowed transmit power and maximum aggregate received power.

The following example sets ADSL port 5 on the line card in slot 7 to only use up to 10.0 dBm of power for upstream transmissions, 11.5 dBm of power for downstream transmissions and -7.0 dBm of aggregated receive power.

```
ras> port adsl power 7-5 fix 100 115 -70
```

## 29.4.15 port adsl psd maximum Command

Syntax:

`port adsl psd maximum <slot-port> <us-psd> <ds-psd>`

where

| | | |
|---|---|---|
| *<us-psd>* | = | Maximum upstream PSD (Power Spectrum Density) mask (between -400 to 40 in units of 0.1 dBm/Hz). |
| *<ds-psd>* | = | Maximum downstream PSD mask (between -400 to 40 in units of 0.1 dBm/Hz). |

This command sets the PSD masks for the upstream and downstream channels. PSD defines the distribution of a line's power in the frequency domain. A PSD mask is a template that specifies the maximum allowable PSD for a line.

The following example sets the maximum upstream and downstream PSD masks of port 1 on the line card in slot 2 to -200 (-20 dBm/Hz) and 10 (1 dBm/Hz) respectively.

```
ras> port adsl psd maximum 2-1 -200 10
```

## 29.4.16 port adsl set Command

Syntax:

`port adsl set <slot-port> <profile> <mode>`

where

| | | |
|---|---|---|
| *<profile>* | = | The ADSL profile that will define the settings of this port. |
| *<mode>* | = | The ADSL operational mode.<br>for Annex A: `gdmt`, `t1413`, `glite`, `auto`, `adsl2` or `adsl2+`<br>for Annex B: `gdmt`, `etsi`, `auto`, `adsl2` or `adsl2+`<br>When set to auto, the port follows whatever mode is set on the other end of the line. |

This command assigns a specific profile to an ADSL port(s) and sets the port's ADSL mode (or standard). The profile defines the maximum and minimum upstream/downstream rates, the target upstream/downstream signal noise margins, and the maximum and minimum upstream/downstream acceptable noise margins of all the ADSL ports to which you assign the profile.

When the mode is set to `auto`, the connection rates are governed by the negotiated ADSL mode regardless of the rates configured in the profile. For example, if the profile is set to use a rate of 18000 Kbps, that speed is only supported if the negotiated ADSL mode is ADSL 2+. Any other ADSL mode will limit the rate to what is supported by the specific ADSL standard.

The following example sets ADSL port 5 on the line card in slot 7 to use the gold profile and adsl2+ mode.

```
ras> port adsl set 7-5 gold adsl2+
```

### 29.4.17 port adsl uscarrier Command

Syntax:

`port adsl uscarrier <slot-port> <m0> <m1>`

where

| | | |
|---|---|---|
| *<m0>,<m1>* | = | The upstream subcarriers to be disabled. Each <mx> can use up to 8 hexadecimal digits (0~ffffffff). Each <mx> represents 32 carrier tones (each hexadecimal digit represents 4 tones).<br>*m0*: tones 0~31<br>*m1*: tones 32~63<br>The hexadecimal digit is converted to binary and a '1' disables the corresponding tone. Disabling a carrier tone turns it off so the system does not send data on it. |

This command disables upstream carrier tones from 0 to 63 on the specified ADSL port(s). Use this command to have the system not use an ADSL line's tones that are known to have a high noise level.

The following example disables upstream carrier tone 8 for ADSL port 5 on the line card in slot 7.

```
ras> port adsl uscarrier 7-5 00000080 0
```

This example disables upstream carrier tones 8 and 9 for ADSL port 5 on the line card in slot 7.

```
ras> port adsl uscarrier 7-5 00000180 0
```

## 29.5 port copy Command

Syntax:

`port copy <source> <destination>`

where

| | | |
|---|---|---|
| *<source>* | = | The slot and port number from which you want to copy settings. |
| *<destination>* | = | The slot and port number(s) to which you want to copy settings. |

This command copies the port settings from a source port to destination ports on the same type of line card.

The following example copies the settings from port 5 on the line card in slot 7 to all of the ports on the line card in slot 7.

```
ras> port copy 7-5 7-*
```

## 29.6 port disable Command

Syntax:

`port disable <slot-port>`

This command turns off the specified subscriber port(s).

The following example turns off port 5 on the line card in slot 7.

```
ras> port disable 7-5
```

## 29.7 port enable Command

Syntax:

`port enable <slot-port>`

This command turns on the specified subscriber port(s).

The following example turns on port 5 on the line card in slot 7.

```
ras> port enable 7-5
```

## 29.8 Enet Commands

This section covers how to configure settings for the Ethernet subscriber ports (on the ELC).

### 29.8.1 port enet bandwidth Command

Syntax:

`port enet bandwidth <slot-port> <ingress-rate> <egress-rate>`

where

| | | |
|---|---|---|
| *<ingress-rate>* | = | The maximum bandwidth allowed in kilobits per second (Kbps) for the incoming traffic flow on a port. Use a number from 0 to 99968 in increments of 64 kbps. |
| *<egress-rate>* | = | The maximum bandwidth allowed in kilobits per second (Kbps) for the out-going traffic flow on a port. Use a number from 0 to 99968 in increments of 64 kbps. |

This command sets the incoming or outgoing bandwidth control for the specified port(s).

This example sets port 5 on the ELC in slot 4 to only allow 64 Kbps for incoming traffic and 64 Kbps for outgoing traffic.

```
ras> port enet bandwidth 4-5 64 64
```

## 29.8.2 port enet dot3ad aggport Command

Syntax:

`port enet dot3ad aggport <slot-port> t1|t2|…|t10|none`

where

| | | |
|---|---|---|
| `t1~t10` | = | The link aggregation trunk group. Use none to remove the specified port(s) from the trunk group. |

This command creates a link aggregation trunk group for the specified Ethernet (ELC) subscriber port(s).

This example sets ports 1 to 4 on an ELC in slot 4 to be in trunk group t1.

```
ras> port enet dot3ad aggport 4-1~4 t1
```

## 29.8.3 port enet dot3ad disable Command

Syntax:

`port enet dot3ad disable <slot> t1|t2|…|t10`

This command turns off link aggregation on the specified subscriber port trunk group.

This example turns off link aggregation on the t1 trunk group on an ELC in slot 4.

```
ras> port enet dot3ad disable 4 t1
```

## 29.8.4 port enet dot3ad enable Command

Syntax:

`port enet dot3ad enable <slot> t1|t2|…|t10 [lacp]`

This command turns on link aggregation on the specified subscriber port trunk group. Use `lacp` to turn on LACP protocol.

This example turns on link aggregation on the t1 trunk group on an ELC in slot 4.

```
ras> port enet dot3ad enable 4 t1
```

## 29.8.5 port enet dot3ad show Command

Syntax:

`port enet dot3ad show <slot>`

This command displays the link aggregation settings for the Ethernet (ELC) in the specified slot.

This example displays the link aggregation settings for the Ethernet (ELC) in slot 4.

```
ras> port enet dot3ad show 4
agg  enable type    port
---- ------ ------- ------------------------------------------------
t1    -      static  4-1 4-2 4-3 4-4
t2    -      static
t3    -      static
t4    -      static
t5    -      static
t6    -      static
t7    -      static
t8    -      static
t9    -      static
t10   -      static
```

## 29.8.6 port enet flowctrl disable Command

Syntax:

`port enet flowctrl disable <slot-port>`

This command turns off flow control on an Ethernet (ELC) subscriber port.

The following example turns off the flow control on port 5 on the ELC in slot 4.

```
ras> port enet flowctrl disable 4-5
```

## 29.8.7 port enet flowctrl enable Command

Syntax:

`port enet flowctrl enable <slot-port>`

This command turns on flow control on an Ethernet (ELC) subscriber port.

The following example turns on the flow control on port 5 on the ELC in slot 4.

```
ras> port enet flowctrl enable 4-5
```

## 29.8.8 port enet frametype Command

Syntax:

`port enet frametype <slot-port> all|tag`

where

`all|tag =` Specifies all Ethernet frames (tagged and untagged) or only tagged Ethernet frames.

This command sets the specified Ethernet (ELC) subscriber port(s) to accept all Ethernet frames or only those with an IEEE 802.1Q VLAN tag.

The following example sets port 5 on the ELC in slot 4 to accept only tagged frames.

```
ras> port enet frametype 4-5 tag
```

## 29.8.9 port enet priority Command

Syntax:

`port enet priority <slot-port> <priority>`

where

| | | |
|---|---|---|
| *<priority>* | = | The default ingress priority (0~7). 0 is the lowest priority level and 7 is the highest. |

This command sets the default ingress user priority of the specified Ethernet (ELC) subscriber port(s).

The following example sets the default priority of port 5 on the ELC in slot 4 to 3.

```
ras> port enet priority 4-5 3
```

## 29.8.10 port enet pvid Command

Syntax:

`port enet pvid <slot-port> <vid>`

where

| | | |
|---|---|---|
| *<pvid>* | = | The default Port VLAN ID (PVID) assigned to untagged frames or priority-tagged frames received on this port (1~4094). |

This command sets the Port VLAN ID assigned to untagged frames or priority frames (0 VID) received on this Ethernet subscriber port(s).

The following example sets the PVID of port 5 on the ELC in slot 4 to 76.

```
ras>  port enet pvid 4-5 76
```

## 29.8.11 port enet show Command

Syntax:

`port enet show <slot-port>`

This command displays the settings for the specified Ethernet subscriber port(s). An example is shown next for port 5 on the ELC in slot 4.

```
ras> port enet show 4-5
slot-port           :4-5
  pvid              :76
  priority          :3
  frametype         :all
  flowCtrl          :disable
  ingress rate      :0 kbps
  egress rate       :0 kbps

vlan setting:
 vid  port    adv     untag
----- ----- -------- --------
   76 4-5        fix    untag
```

## 29.8.12 port enet tls Commands

Syntax:

```
port enet tls disable <slot-port>
port enet tls enable <slot-port>
port enet tls set <slot-port> <svid> <spriority>
port enet tls show <slot-port>
```

where

| | | |
|---|---|---|
| *<svid>* | = | Sets the service provider ID (from 1 to 4094) to add to received frames. |
| *<spriority>* | = | Sets the IEEE 802.1p priority level (from 0 to 7) for the service provider's VLAN ID. |

Use these commands to configure Transparent LAN Service (TLS) settings on the Ethernet subscriber port(s). Once you enable TLS, all packets will be added an extra "VLAN tag" (SPVID/SPriority) and forwarded toward Gigabit Ethernet interface(s). If you configure an ENET PVID setting and enable TLS, the system does not apply the PVID.

The following shows an example.

- Enables TLS on port 5 on the Ethernet line card in slot 4.
- Configures the service provider's VID to 10 and priority to 7 (highest priority).
- Displays the port's TLS settings.

```
ras> port enet tls enable 4-5
ras> port enet tls set 4-5 10 7
ras> port enet tls show 4-5
slot-port           :4-5
  tls state         :enable
  tls vid           :10
  tls priority      :7
```

### 29.8.13 port enet vlan Commands

Syntax:

`port enet vlan <slot-port> <vid> <registration> <tag>`

where

| | | |
|---|---|---|
| *<vid>* | = | Enter a VID (VLAN ID) to add this channel as a member.<br>This must be the VLAN ID of a VLAN that is already configured. The port that you are configuring must also be set to the fixed status in the VLAN. |
| *<registration>* | = | Enter `join` to have the port be a member of the specified VLAN.<br>Enter `leave` to remove the port from the specified VLAN. |
| *<tag>* | = | Enter `tag` to add a tag to all frames transmitted on this port.<br>Enter `untag` to not add tags. |

This command sets the VLAN settings on the Ethernet subscriber port(s).

The following example sets port 5 on the ELC in slot 4 to join VLAN 6. The port also adds a tag to frames.

```
ras> port enet vlan 4-5 6 join tag
```

## 29.9 G.bond Commands

This section shows how to set up G.bond settings on your device. G.bond (also known as port bonding) allows subscribers to connect to an ISP using data streams spread over multiple DSL lines. The total available bandwidth for the subscriber then becomes the sum of the bandwidth available for each of the subscriber's line connections. As well as extra bandwidth, additional DSL lines also provide backup support.

### 29.9.1 port gbond set Command

Syntax:

`port gbond set <slot> <bond_name> <portlist>`
where

| | | |
|---|---|---|
| *<slot>* | = | The line card ID. |
| *<bond_name>* | = | A descriptive name for the gbond group of DSL lines. |
| *<portlist>* | = | The ports on a line card that connect the DSL lines on which gbond is configured. |

This command sets up a gbond group on the specified group of ports on a slot. The following is an example.

```
ras> port gbond set 2 group2 3,4
```

### 29.9.2 port gbond show Command

Syntax:

```
port gbond show <slot> [<bond_name>]
where
```

<slot> = The line card ID.

<bond_name> = A descriptive name for the gbond group of DSL lines.

This command displays gbond settings on the specified group of ports on a slot. The following is an example.

```
ras> port gbond show 2
slot bond name
     port list
---- -----------------------------------
   2 Group1
     1,2
   2 group2
     3,4
```

### 29.9.3 port gbond delete Command

Syntax:

```
port gbond delete <slot> <bond_name>
where
```

<slot> = The line card ID.

<bond_name> = A descriptive name for the gbond group of DSL lines.

This command deletes the specified gbond group. The following is an example.

```
ras> port gbond delete 2 group2
ras> port gbond show 2
slot bond name
     port list
---- ---------------------------------------
   2 Group1
     1,2
```

## 29.10 IP Bridge Commands

These sections explain how to set up the IP bridge function in the system.

The IP bridge function is designed for large-scale, flat, access networks, and it is ideal when the network is based on Ethernet. When the IP bridge is enabled, the system forwards frames based on the destination IP address, instead of the destination MAC address, and it replaces the source MAC address with its own MAC address.

You can follow these steps to set up a simple IP bridge.

1. Create a domain. (Each domain is an ISP.)

2. Create one or more VLANs in the domain. (For example, one VLAN is for high-speed Internet, and another VLAN is for VoIP.)
3. Specify one or more edge routers for the domain.
4. Create routing table entries, so the system forwards frames to the appropriate edge router.
5. Create downlink interfaces, so the system forwards frames to the appropriate subscribers.
6. Create PVCs for the subscribers.

## 29.11 IP Bridge ARP Proxy Commands

Use these commands to look at and flush the Address Resolution Protocol (ARP) table for each domain. You can also configure how long the system keeps entries in the ARP table.

The system is an ARP proxy for edge routers and subscribers in an IP bridge. You can configure basic settings for this, and you can look at (and flush, in some cases) the (PVC, MAC, IP, VID) information the system has learned using DHCP snooping and ARP.

### 29.11.1 port ipbpvc arpproxy age Command

Syntax:

```
port ipbpvc arpproxy age <sec>
```

where

| | | |
|---|---|---|
| *<sec>* | = | The number of seconds (10~10000) the device is to keep the Address Resolution Protocol table's entries of IP addresses in IP bridges. |

This command configures how long the device stores the IP addresses of CPE devices in IP bridges in the Address Resolution Protocol table.

### 29.11.2 port ipbpvc arpproxy flush Command

Syntax:

```
port ipbpvc arpproxy flush <all | edgerouter [<ip-address> <vid>] | interface
[<ip/mask> <vid>]>
```

where

| | | |
|---|---|---|
| `all` | = | All ARP table entries. |
| *<ip-address>* | = | IP address, in dotted decimal notation. |
| *<mask>* | = | Number of bits <1..32> in the subnet mask. |
| *<vid>* | = | The ID (<1..4094>) of the VLAN. |

This command clears the specified entries in the Address Resolution Protocol table(s).

### 29.11.3 port ipbpvc arpproxy show Command

Syntax:

```
port ipbpvc arpproxy show
```

This command displays how long the device stores the IP addresses of IP bridge devices in the Address Resolution Protocol table.

The following is an example.

```
ras> port ipbpvc arpproxy show
age=300 (sec)
```

## 29.12 IP Bridge PVC Commands

Use the `port ipbpvc delete, set` (see Section 29.17.4 on page 561) and `show` (see Section 29.17.5 on page 562) commands to set up and maintain PVCs for subscribers in an IP bridge.

IP bridge PVCs are similar to regular PVCs and are endpoints of the IP bridge. In addition, IP bridge PVCs are one of two types, IP over Ethernet or IP over ATM, depending on the underlying network.

The PVID is used to identify the domain the PVC is in, so the PVID must be in a domain.

## 29.13 port ipbpvc delete Command

Syntax:

`port ipbpvc delete <slot-port-vpi/vci>`

where

*vpi/vci* = The VPI and VCI of an individual PVC.

This command deletes the specified PVC channel in an IP bridge.

The following example deletes the IP bridge PVC on ADSL port 10 with VPI 40, VCI 73.

```
ras> port ipbpvc show 1-10
pvc              type   pvid pri ipbpvctype profile
---------------- ------- ---- --- ---------- --------------------------------
--
1-10-40/73      ipb     402  2   llc        DEFVAL
ras> port ipbpvc delete 1-10-40/73
ras> port ipbpvc show 1-10
ras>
```

## 29.14 IP Bridge Domain Commands

Use these commands to set up and maintain domains in IP bridges.

A domain represents an ISP. Each domain is defined by (and dominates) the VLAN that are in it and has its own routing table and ARP table. As a result, two or more VLANs in different domains can use the same IP subnet, and one network can support multiple ISPs.

VLANs in IP bridges are exclusive. They can be in at most one domain. In addition, VLANs in IP bridges share the same VLAN space as regular VLANs, so VLANs in IP bridges must have different VLAN IDs than regular VLANs.

## 29.14.1 port ipbpvc domain delete Command

Syntax:

`port ipbpvc domain delete <domain name>`

where

`<domain name>` = The name of the domain.

This command deletes the specified domain.

You have to remove the VLANs that are in the domain first.

## 29.14.2 port ipbpvc domain dhcpvlan enable Command

Syntax:

`port ipbpvc domain dhcpvlan enable <domain name> <vid>`

where

`<domain name>` = The name of the domain.

`<vid>` = The ID (<1..4094>) of the VLAN.

This setting has no effect on DHCP packets that come from VLANs where the system's DHCP relay settings are active. (See Chapter 20 on page 443. The DHCP relay settings take precedence over the IP bridge DHCP VLAN setting.)

This command specifies the VLAN where the domain's DHCP server is located. The VLAN must already be in the domain. The MSC1000G forwards subscribers' DHCP packets to the selected VLAN and changes the source MAC address to the MSC1000G's MAC address.

The MSC1000G still adds whatever Option 82 information is specified for the VLAN in the DHCP relay settings. (See Chapter 20 on page 443.)

In the following example, domain "example3" has its DHCP server in VLAN 401.

```
ras> port ipbpvc domain dhcpvlan enable example3 401
```

## 29.14.3 port ipbpvc domain dhcpvlan disable Command

Syntax:

`port ipbpvc domain dhcpvlan disable <domain name>`

where

| | | |
|---|---|---|
| *<domain name>* | = | The name of the domain. |

This setting has no effect on DHCP packets that come from VLANs where the MSC1000G's DHCP relay settings are active. (See Chapter 20 on page 443. The DHCP relay settings take precedence over the IP bridge DHCP VLAN setting.)

This command specifies that there is no DHCP server for the domain, in which case the MSC1000G does not change the source MAC address in DHCP packets.

The MSC1000G still adds whatever Option 82 information is specified for the VLAN in the DHCP relay settings. (See Chapter 20 on page 443.)

## 29.14.4 port ipbpvc domain set Command

Syntax:

`port ipbpvc domain set <domain name>`

where

| | | |
|---|---|---|
| *<domain name>* | = | You can use 1-31 printable English keyboard characters. Spaces are not allowed. |

This command creates the domain with the specified name.

An example is shown next.

```
port ipbpvc domain set example
```

## 29.14.5 port ipbpvc domain show Command

Syntax:

`port ipbpvc domain show [<domain name>]`

where

| | | |
|---|---|---|
| *<domain name>* | = | The name of the domain. |

This command displays the settings for the specified domain and the VLAN that are in the domain.

An example is shown next.

```
ras> port ipbpvc domain show
domain                          vid
------------------------------- ----------------------------------------
ISP1                            *101 102
example
```

The output values correspond to the input values of other IP bridge domain commands.

### 29.14.6 port ipbpvc domain vlan Command

Syntax:

`port ipbpvc domain vlan <domain name> <vid> join|leave`

where

| | | |
|---|---|---|
| `<domain name>` | = | The name of the domain. |
| `<vid>` | = | The ID (<1..4094>) of the VLAN. |
| `join\|leave` | = | Specifies whether you want to add the specified VLAN to (`join`) or remove the specified VLAN from (`leave`) the domain. |

This command adds the specified VLAN to (`join`) or removes the specified VLAN (`leave`) from the specified domain. VLANs in IP bridges share the same VLAN space as regular VLANs, so VLANs in IP bridges must have different VLAN IDs than regular VLANs. Use the `port ipbpvc VLAN` command to configure the VLAN (see Section 29.22.10 on page 571).

You have to delete every IP bridge setting (including DHCP VLAN) that uses the selected VLAN before you can remove it from the domain.

In the following example, VLAN 402 is added to domain “example”.

```
ras> port ipbpvc domain vlan example 402 join
```

## 29.15 IP Bridge Edge Router Commands

Use these commands to set up and maintain edge routers in an IP bridge.

Edge routers are usually the gateways that are provided to the subscribers. They can also be gateways that are specified in static routing table entries. Each edge router, in addition to its IP address, has an associated VLAN ID. When the MSC1000G forwards a frame to an edge router, it uses this VLAN ID to replace whatever VLAN ID the subscriber specified.

### 29.15.1 port ipbpvc edgerouter delete Command

Syntax:

`port ipbpvc edgerouter delete <ip-address> <vid>`

where

| | | |
|---|---|---|
| `<ip-address>` | = | IP address, in dotted decimal notation. |
| `<vid>` | = | The ID (<1..4094>) of the VLAN. |

This command deletes the edge router with the specified IP address and VLAN ID.

The following example deletes edge router 192.168.1.244 with VID 402.

```
ras> port ipbpvc edgerouter delete 192.168.1.244 402
```

## 29.15.2 port ipbpvc edgerouter set Command

Syntax:

`port ipbpvc edgerouter set <ip/mask> <vid>`

where

| | | |
|---|---|---|
| *<ip/mask>* | = | Edge router's IP address, in dotted decimal notation and number of bits <1..32> in the subnet mask. |
| *<vid>* | = | The ID (<1..4094>) of the VLAN. |

This command creates an edge router with the specified IP address, subnet mask, and VID. The MSC1000G uses the VLAN ID when it forwards frames to the edge router. It also uses the VLAN ID to identify the domain the edge router is in.

The following example creates edge router 192.168.1.244 with subnet mask 255.255.255.0 and VID 402.

```
ras> port ipbpvc edgerouter set 192.168.1.244/24 402
```

## 29.15.3 port ipbpvc edgerouter show Command

Syntax:

`port ipbpvc edgerouter show <all | domain-name [<vid>]>`

where

| | | |
|---|---|---|
| *<domain name>* | = | The name of the domain. |
| *<vid>* | = | The ID (<1..4094>) of the VLAN. |

This command displays the edge routers for the specified VLAN or for all VLAN.

An example is shown next.

```
ras> port ipbpvc edgerouter show all
domain                          ip/mask            vid
------------------------------- ------------------ --------
ISP1                            123.23.19.249/24   102
ISP1                            123.23.19.254/24   101
example                         192.168.1.200/24   402
```

The output values correspond to the input values of other IP bridge edge router commands.

# 29.16 IP Bridge Interface Commands

Use these commands to set up and maintain forwarding information for downstream traffic.

Downlink interfaces provide forwarding information for downstream traffic. The system learns some of this information by snooping DHCP packets. For static IP addresses, you should provide this information manually. In this case, specify the VLAN ID and, optionally, the PVC for a range of IP addresses. The system uses the VLAN ID to identify the domain the downlink interface is in. Downlink interfaces in the same domain cannot have overlapping IP addresses.

## 29.16.1 port ipbpvc interface delete Command

Syntax:

`port ipbpvc interface delete <ip/mask> <vid>`

where

| | | |
|---|---|---|
| *<ip/mask>* | = | Downlink interface's IP address, in dotted decimal notation and number of bits <1..32> in the subnet mask. |
| *<vid>* | = | The ID (<1..4094>) of the VLAN. |

This command deletes the specified downlink interface. You can only remove downlink interfaces that were added manually.

The following example removes the downlink interface for 192.168.1.200/24 in VLAN 402.

```
ras> port ipbpvc interface show 402
ip/mask            vid  slot port vpi vci
------------------ ---- ---- ---- --- ----
192.168.1.200/24     402  -    -    -   -
ras> port interface delete 192.168.1.200/24 402
ras> port ipbpvc interface show 402
ras>
```

## 29.16.2 port ipbpvc interface set Command

Syntax:

`port ipbpvc interface set <ip/mask> <vid> [<slot-port-vpi/vci>]`

where

| | | |
|---|---|---|
| *<ip/mask>* | = | Downlink interface's IP address, in dotted decimal notation and number of bits <1..32> in the subnet mask. |
| *<vid>* | = | The ID (<1..4094>) of the VLAN. |
| *vpi/vci* | = | The VPI and VCI of an individual PVC. |

This command creates the specified downlink interface. The *<ip-address>*/<mask> specifies the IP address and subnet mask of the VLAN or subscriber. If the destination IP address of a packet is in this range, the system forwards the frame to the specified VLAN and PVC, if any.

The system uses the specified VLAN ID when it forwards frames to the VLAN or subscriber. It also uses the VLAN ID to identify the domain the downlink interface is in.

Make sure you specify a valid IP bridge PVC. Do not specify PVCs that are not set as the IPB PVCs (see Section 29.17.4 on page 561).

The following example creates a downlink interface that forwards frames for IP addresses 192.168.3.0~192.168.3.255 to VLAN 402.

```
ras> port ipbpvc interface set 192.168.3.0/24 402
```

### 29.16.3 port ipbpvc interface show Command

Syntax:

`port ipbpvc interface show show all|<ip/mask>|<vid>|<ip/mask> <vid>`

where

| | | |
|---|---|---|
| *ip/mask* | = | Downlink interface's IP address, in dotted decimal notation and number of bits <0..32> in the subnet mask. |
| *vid* | = | The ID (<1..4094>) of the VLAN. |

This command displays downlink interfaces created manually. It does not show forwarding information learned by snooping DHCP packets.

An example is shown next.

```
ras> port ipbpvc interface show 402
ip/mask            vid  slot port vpi vci
------------------ ---- ---- ---- --- ----
192.168.3.0/24     402  -    -    -   -
```

The output values correspond to the input values of other IP bridge downlink interface commands.

## 29.17 IP Bridge Routing Table Commands

Use these commands to set up and maintain the routing table for each domain.

Each domain has its own routing table. Each routing table contains entries that, based on the destination IP address, control where the system forwards packets (for upstream and downstream traffic). The system automatically creates routing table entries for each downlink interface and for each edge router in the domain. You can create additional entries by specifying the edge router to which the system should forward traffic for a particular destination IP address or IP subnet.

## 29.17.1 port ipbpvc route delete Command

Syntax:

`port ipbpvc route delete <domain-name> <ip/mask> <nexthop>`

where

| | | |
|---|---|---|
| *<domain-name>* | = | The name of the domain. |
| *<ip/mask>* | = | IP address, in dotted decimal notation and number of bits <0..32> in the subnet mask. |
| *<nexthop>* | = | IP address, in dotted decimal notation. |

This command deletes the specified entry from the routing table of the specified domain. You can only remove entries that were added manually.

The following example removes the entry for 123.32.37.0~123.32.37.255 for domain "example2".

```
ras> adsl ipbpvc route show example2
domain name          ip/netmask          gateway ip      metric pri
-------------------- ------------------- --------------- ------ ---
example2             0.0.0.0/0           192.168.1.252        1   0
example2             123.23.37.0/24      192.168.1.250        1   0
example2             192.168.2.0/24      192.168.1.249        1   0
ras> adsl ipbpvc route delete example2 123.23.37.0/24 192.168.1.250
ras> adsl ipbpvc route show example2
domain name          ip/netmask          gateway ip      metric pri
-------------------- ------------------- --------------- ------ ---
example2             0.0.0.0/0           192.168.1.252        1   0
example2             192.168.2.0/24      192.168.1.249        1   0
```

## 29.17.2 port ipbpvc route set Command

Syntax:

`port ipbpvc route set <domain-name> <ip/mask> <nexthop> <metric> [<priority>]`

where

| | | |
|---|---|---|
| *<domain-name>* | = | The name of the domain. |
| *<ip/mask>* | = | IP address, in dotted decimal notation and number of bits <0..32> in the subnet mask. |
| *<nexthop>* | = | IP address, in dotted decimal notation. |
| *<metric>* | = | The metric <1..15> represents the "cost" of transmission for routing purposes. IP routing uses hop count as the measurement of cost, with a minimum of 1 for directly-connected networks. Select the number that approximates the cost for this link The number need not be precise, but it must be between 1 and 15. In practice, 2 or 3 is usually a good number.<br>If two entries have the same metric, the system uses the one with the lower IP address. |
| *<priority>* | = | The IEEE 802.1p priority value <0> ~ <7>. |

This command creates the specified entry in the routing table of the specified domain.

The <*ip-address*>/<mask> specifies the range of IP addresses to which this entry applies. If the destination IP address of a packet is in this range, the system forwards the frame to the specified IP address <nexthop>. If <nexthop> corresponds to an edge router configured using the edge router commands (see Section 29.15 on page 556), the system uses the associated VLAN ID. In addition,

- If the edge router is in the same domain as the entry, the entry is used for upstream traffic.
- If the edge router is in a different domain than the entry, the entry is used for downstream traffic.

If <*nexthop*> is not set up in the edge router screen, the system uses the entry for downstream traffic and does not change the VLAN ID.

If the <*priority*> is not specified, the default value is zero. This is applied to incoming frames without a <*priority*> tag.

The following example creates an entry in the routing table for domain “example3”. This entry forwards traffic for IP addresses 192.168.4.0~192.168.4.255 to edge router 192.168.1.244.

```
ras>  port ipbpvc route set example3 192.168.4.0/24 192.168.1.244 1
```

## 29.17.3 adsl ipbpvc route show Command

Syntax:

`adsl ipbpvc route show [all|<domain-name>|<ip/mask>|<domain-name><ip-address>/<mask>]`

where

| | | |
|---|---|---|
| <*domain-name*> | = | The name of the domain. |
| <*ip/mask*> | = | IP address, in dotted decimal notation and number of bits <0..32> in the subnet mask. |

This command displays routing table entries created manually for the specified domain and/or range of IP addresses. It does not show entries added automatically by the system.

An example is shown next.

```
ras> port ipbpvc route show all
domain                          ip/mask            nexthop         mtrc pr
------------------------------- ------------------ --------------- ---- --
ISP1                            0.0.0.0/0          123.23.19.254   15   0
ISP1                            192.169.1.0/24     123.23.19.249   5    0
example3                        192.168.4.0/24     192.168.1.244   1    -
```

The output values correspond to the input values of other IP bridge routing table commands.

## 29.17.4 port ipbpvc set Command

Syntax:

`port ipbpvc set <slot-port-vpi/vci> <profile> <vid> <priority> <type>`

where

| | | |
|---|---|---|
| *<vpi/vci>* | = | The VPI setting can be 0 to 255. The VCI setting can be 32 to 65535 if the vpi is 0 or 1 to 65535 if the vpi is not 0. |
| *profile* | = | Assign an ATM profile to use for this channel's traffic shaping. |
| *<vid>* | = | The default VID (1 to 4094). Each PVC must have a unique VID since the system forwards traffic back to the subscribers based on the VLAN ID.<br>You must assign a default VID (1 to 4094) and IEEE 802.1p default priority (0 to 7) to normal channels. Each PVC must have a unique VID (since the system forwards traffic back to the subscribers based on the VLAN ID). |
| *<priority>* | = | This is the priority value (0 to 7) to add to incoming frames without a (IEEE 802.1p) priority tag. |
| *<type>* | = | Specify the encapsulation type for the PVC.<br>`llc` and `vc` are for a PVC running on Ethernet (IPoE).<br>`llc_r` and `vc_r` are for a PVC running on ATM (IPoA). |

This command allows the configuration of a PVC (permanent virtual circuit) for one or a range of ADSL ports in an IP bridge.

The following example sets a PVC on slot 1, DSL port 10 with VPI 40, VCI 73, DEFVAL profile, default VID 402 and priority 2. It uses LLC encapsulation over Ethernet.

```
ras> port ipbpvc set 1-10-40/73 DEFVAL 402 2 llc
ras> port ipbpvc show 1-10
pvc              type   pvid pri ipbpvctype profile
---------------- ------- ---- --- ---------- --------------------------------
--
1-10-40/73      ipb     402  2   llc        DEFVAL
```

## 29.17.5 port ipbpvc show Command

Syntax:

`port ipbpvc show <slot>|<slot-port>|<slot-port-vpi/vci>`

where

| | | |
|---|---|---|
| *vpi/vci* | = | The VPI and VCI of an individual PVC. |

This command allows you to display the PVCs for subscribers in an IP bridge.

An example is shown next.

```
ras> port ipbpvc show 1-10
pvc              type   pvid pri ipbpvctype profile
---------------- ------- ---- --- ---------- --------------------------------
--
1-10-40/73      ipb     402  2   llc        DEFVAL
```

The output values correspond to the input values of other IP bridge PVC commands.

### 29.17.6 port ipbpvc vlan Command

Syntax:

`port ipbpvc vlan <slot-port-vpi/vci> <vid> <registration> <tag>`

where

| | | |
|---|---|---|
| *vpi/vci* | = | The VPI and VCI of an individual PVC. |
| <*vid*> | = | The default VID (1 to 4094). Each PVC must have a unique VID since the system forwards traffic back to the subscribers based on the VLAN ID.<br>You must assign a default VID (1 to 4094) and IEEE 802.1p default priority (0 to 7) to normal channels. Each PVC must have a unique VID (since the system forwards traffic back to the subscribers based on the VLAN ID). |
| <*registration*> | = | Use `join` to have the port be a member of the specified VLAN.<br>Use `leave` to remove the port from the specified VLAN. |
| <*tag*> | = | Use `tag` to tag all frames transmitted on this PVC with the port's VID.<br>Use `untag` to not frames transmitted on this PVC with the port's VID. |

Use this command to configure a IPB PVC's VLAN settings.

The following example sets the PVC on slot 1, DSL port 10 with VPI 40, VCI 73 to be a member of VLAN 402 and not tag the frames sent to this PVC.

```
ras> port ipbpvc vlan 1-10-40/73 402 join untag
```

## 29.18 port name Command

Syntax:

`port name <slot-port> <name>`

where

| | | |
|---|---|---|
| <*name*> | = | A name to identify the subscriber port. |

This command sets a name for the specified subscriber port(s).

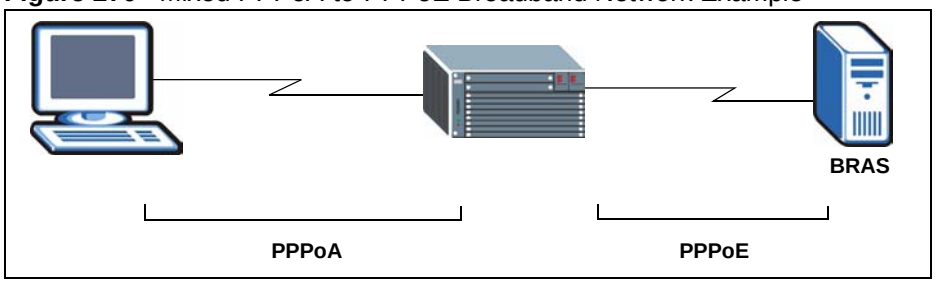
The following example sets port 5 on the line card in slot 2 to use the name Bob.

```
ras> port name 2-5 bob
```

## 29.19 PPPoA to PPPoE (PAE) Translation

Before migrating to an Ethernet infrastructure, a broadband network might consist of PPPoA connections between the CPE devices and the DSLAM and PPPoE connections from the DSLAM to the BRAS (Broadband Remote Access Server). The following figure shows a network example.

**Figure 270** Mixed PPPoA-to-PPPoE Broadband Network Example




In order to allow communication between the end points (the CPE devices and the BRAS), you need to configure the DSLAM to translate PPPoA frames to PPPoE packets and vise versa.

When PPPoA packets are received from the CPE, the ATM headers are removed and the system adds PPPoE and Ethernet headers before sending the packets to the BRAS. When the system receives PPPoE packets from the BRAS, PPPoE and Ethernet headers are stripped and necessary PVC information (such as encapsulation type) is added before forwarding to the designated CPE.

You can use the `port paepvc` command to create PVCs for PAE translation.

## 29.19.1 port paepvc delete Command

Syntax:

`port paepvc delete <slot-port-vpi/vci>`

This command removes a PAE PVC.

## 29.19.2 port paepvc set Command

Syntax:

`port paepvc set <slot-port-vpi/vci> <profile> <mux> <pvid> <priority> [acname <acname>] [srvcname <srvcname>] [hellotime <hellotime>]`

where

| | | |
|---|---|---|
| *<profile>* | = | Name of an ATM profile. |
| *<mux>* | = | Encapsulation method (llc or vcmux). |
| *<acname>* | = | This field is optional. Specify the hostname of a remote access concentrator if there are two access concentrators (or BRAS) on the network or that you want to allow PAE translation to the specified access concentrator. |
| *<srvname>* | = | This field is optional. Specify the name of the service that uses this PVC. This must be a service name that you configure on the remote access concentrator. |

This command creates a PPPoA-to-PPPoE PVC to allow communication between the ATM (CPE) and Ethernet network (BRAS) segments. The PVC is mapped to a PPPoE session that connects to the specified BRAS.

The following example creates a PPPoA-to-PPPoE PVC (1/33) for port 1 on the line card in slot 3. The PVC uses llc encapsulation and the DEFVAL ATM profile with a priority of 1. This configuration is for the video service on the vom access concentrator. The switch waits until the hello time timeout before terminating the PPPoE session.

```
ras> port paepvc set 3-1-1/33 DEFVAL llc 2 1 acname vom srvcname video
hellotime 10
```

### 29.19.3 port paepvc show Command

Syntax:

`port paepvc show <slot>|<slot-port>|<slot-port-vpi/vci>`

This command displays the PPPoA-to-PPPoE PVC settings for the specified port and/or slot.

The following example displays the settings on the line card in slot 3.

```
ras> port paepvc show 3
pvc              type   mux   pvid  pri  htime profile/acname/srvcname
-------------- ------- ----- ------ ---- ----- -------------------------
3-1-1/33           pae  llc       2    1    10 DEFVAL/test/example
ras>
```

## 29.20 port pots gain Command

Syntax:

`port pots gain <slot-port> <tx-gain> <rx-gain>`

where

| | | |
|---|---|---|
| *<tx-gain>* | = | This sets the amount of gain (increase in volume) you want to apply to the signal received from the subscriber and transmitted to the SIP server. |
| *<rx-gain>* | = | This is the amount of gain (increase in volume) you want to apply to the signal received from the SIP server and transmitted to the subscriber. |

This command sets the amount of gain to apply to the signal the subscriber transmits (tx) or the signal the subscriber receives (rx) for the specified port and/or slot.

The gain is measured in tenths of a decibel and the range can be from -200 to 200. Enter a negative value to decrease the volume.

The following example sets slot 3's port 5 to use a gain of 10 decibels for the signal from the subscriber and a gain of 6 decibels for the signal going to the subscriber.

```
ras> port pots gain 3-5 100 60
```

## 29.21 port ppvc Commands

Use the port ppvc commands to configure PPVCs and add and remove member PVCs.

## 29.21.1 port ppvc delete Command

Syntax:

`port ppvc delete <slot-port-vpi/vci>`

This command removes a PPVC. Removing a PPVC also deletes all of the member PVCs.

The following example removes a PPVC with VPI 8 and VCI 35 for port 5 on the line card in slot 7.

```
ras> port ppvc delete 7-5-8/35
```

## 29.21.2 port ppvc member delete Command

Syntax:

`port ppvc member delete <slot-port-vpi/vci> <vpi/vci>`

where

| | | |
|---|---|---|
| *<slot-port-vpi/vci>* | = | The slot and port(s) and VPI/VCI of the PPVC. |
| *<vpi/vci>* | = | The VPI and VCI of the individual PVC that you are removing from the PPVC. |

This command removes a PVC from a PPVC.

The following example removes a PVC that uses VPI 8 and VCI 36 from a PPVC with VPI 8 and VCI 35 for port 5 on the line card in slot 7.

```
ras> port ppvc member delete 7-5-8/35 8/36
```

## 29.21.3 port ppvc member set Command

Syntax:

`port ppvc member set <slot-port-vpi/vci> <vpi/vci> <atmprofile> <level>`

where

| | | |
|---|---|---|
| *<slot-port-vpi/vci>* | = | The slot and port(s) and VPI/VCI of the PPVC. |
| *<vpi/vci>* | = | The VPI and VCI of the individual PVC that you are adding to the PPVC. The VPI setting can be 0 to 255. The VCI setting can be 32 to 65535 with a VPI of 0 or 1 to 65535 if the VPI is not 0. |
| *<atmprofile>* | = | The name of an ATM profile. |
| *<level>* | = | The priority queue (0~3) to use for this PVC's traffic. 3 is the highest priority. |

This command adds a member PVC to a PPVC. You must create the PPVC before you use this command to add a member.

The following example adds a PVC to a PPVC with VPI 8 and VCI 35 for port 5 on the line card in slot 7. The PVC uses VPI 8 and VCI 36, the DEFVAL ATM profile and priority queue 2.

```
ras> port ppvc member set 7-5-8/35 8/36 DEFVAL 2
```

## 29.21.4 port ppvc set Command

Syntax:

`port ppvc set <slot-port-vpi/vci> <mux> <pvid> <priority>`

where

| | | |
|---|---|---|
| *<slot-port-vpi/vci>* | = | The slot, port(s) and VPI/VCI of the PPVC. |
| *<mux>* | = | The type of encapsulation: `llc`, `vcmux` |
| *<pvid>* | = | Set a default VID (1 to 4094) for the channel. The channel can only forward frames with this VLAN ID. The system would drop any frames received from the subscriber that are tagged with another VLAN ID.<br>Each PVC must have a unique VID since the system forwards traffic back to the subscribers based on the VLAN ID. |
| *<priority>* | = | Set an IEEE 802.1p default priority (0 to 7) to add to incoming frames without a (IEEE 802.1p) priority tag. |

This command creates a PPVC.

The following example creates a PPVC with VPI 8 and VCI 35 for port 5 on the line card in slot 7. The PPVC uses llc encapsulation and default VID 25. Any frames received without an IEEE 802.1p priority tag will be assigned a priority of 3.

```
ras> port ppvc set 7-5-8/35 llc 25 3
```

## 29.21.5 port ppvc show Command

Syntax:

`port ppvc show <slot>|<slot-port>|<slot-port-vpi/vci> [detail]`

where

| | | |
|---|---|---|
| *<slot-port-vpi/vci>* | = | The slot and port(s) and VPI/VCI of the PPVC. |
| *<vid>* | = | The VLAN ID. Valid parameter range = [1 – 4094].<br>This must be the VLAN ID of a VLAN that is already configured. The ports specified in this command must also be set to the fixed status in the VLAN. |
| `[detail]` | = | Display the PPVC's VLAN configuration in addition to the other PPVC settings. |

This command displays the runtime configured PPVCs.

The following example displays the PPVCs configured on the port 5 on the line card in slot 7. It also displays VLAN information.

```
ras> port ppvc show 7-5-8/35 detail
pvc             type   mux   pvid  pri  profile
--------------- ------ ----- ------ ---- --------------------------------
7-5-8/35        prio   llc      25    3

member:
vpi/vci   level profile
--------- ----- --------------------------------
8/36      2     DEFVAL

vlans:
idx  vlanid    adv     untag
--- -------- -------- --------
  1       25      fix    untag
  2       28      fix    untag
```

## 29.21.6 port ppvc vlan Command

Syntax:

`port ppvc vlan <slot-port-vpi/vci> <vid> <registration> <tag>`

where

| | | |
|---|---|---|
| *<slot-port-vpi/vci>* | = | The slot and port(s) and VPI/VCI of the PPVC. |
| *<vid>* | = | The VLAN ID. Valid parameter range = [1 – 4094].<br>This must be the VLAN ID of a VLAN that is already configured. The ports specified in this command must also be set to the fixed status in the VLAN. |
| *<registration>* | = | The VLAN membership setting.<br>`join`: Adds the PVC to the VLAN.<br>`leave`: Removes the PVC from the VLAN. |
| *<tag>* | = | The VLAN tagging setting.<br>`tag`: The specified port(s) accept only incoming Ethernet frames that have a VLAN tag.<br>`untag`: The specified port(s) accept only incoming Ethernet frames that do not have a VLAN tag. |

This command adds a PPVC to a VLAN or removes a PPVC from a VLAN. It also sets whether the PPVC accepts incoming Ethernet frames with or without a VLAN tag.

The following example adds the PPVC on ADSL port 5 in line card 7 with VPI 8 and VCI 35 to VLAN 28.

```
ras> port ppvc vlan 7-5-8/35 28 join untag
```

# 29.22 port pvc Commands

Use the following `port pvc` commands to configure PVCs (Permanent Virtual Circuits) on the DSL ports.

## 29.22.1 port pvc delete Command

Syntax:

`port pvc delete <slot-port-vpi/vci>`

This command removes the specified PVC channel.

The following example removes the PVC on DSL port 5 on the line card in slot 2 with VPI 8 and VCI 35.

```
ras> port pvc delete 2-5-8/35
```

## 29.22.2 port pvc mvlan disable Command

Syntax:

`port pvc mvlan disable <slot-port-vpi/vci>`

This command deactivates multicast VLAN on the PVC. No multicast traffic will be sent to this PVC.

## 29.22.3 port pvc mvlan enable Command

Syntax:

`port pvc mvlan enable <slot-port-vpi/vci>`

This command enables multicast VLAN on the PVC.

## 29.22.4 port pvc set Command

Syntax:

`port pvc set <slot-port-vpi/vci> <profile> <mux> <pvid> <priority>`

where

| | | |
|---|---|---|
| *<slot-port-vpi/vci>* | = | The slot and port(s) and VPI/VCI of the PVC. |
| *<profile>* | = | The name of an ATM profile. |
| *<mux>* | = | The type of encapsulation: `llc`, `vcmux` |
| *<pvid>* | = | Set a default VID (1 to 4094) for the channel. The channel can only forward frames with this VLAN ID. The system would drop any frames received from the subscriber that are tagged with another VLAN ID.<br>Each PVC must have a unique VID since the system forwards traffic back to the subscribers based on the VLAN ID. |
| *<priority>* | = | Set an IEEE 802.1p default priority (0 to 7) to add to incoming frames without a (IEEE 802.1p) priority tag. |

This command creates or modifies a PVC setting.

The following example sets a PVC on DSL port 5 on the line card in slot 2 with VPI 8, VCI 35, the DEFVAL profile, default VID 2 and priority 3.

```
ras> port pvc set 2-5-8/35 DEFVAL vcmux 2 3
```

## 29.22.5 port pvc show Command

Syntax:

`port pvc show <slot>|<slot-port>|<slot-port-vpi/vci> [detail]`

where

| | | |
|---|---|---|
| *<slot-port-vpi/vci>* | = | The slot and port(s) and VPI/VCI of the PVC. |
| [detail] | = | Displays in depth information about the runtime configured virtual channels. |

This command displays the runtime configured virtual channels for the specified DSL port(s).

The following example displays the virtual channels of DSL port 5 on the line card in slot 2.

```
ras> port pvc show 2-5
pvc               type   mux   pvid  pri  mvlan profile
--------------- ------- ----- ------ ---- ----- ------------
2-5-0/33        bridged  llc       1    0   -   DEFVAL
2-5-8/35        bridged vcmux      2    3   -   DEFVAL
```

## 29.22.6 port pvc usratelimit enable Command

Syntax:

`port pvc usratelimit enable <pvc>`

This command activates upstream rate limiting on the PVC. The following example activates upstream rate settings on the PVC (0/33 of port 1 on the line card in slot 5).

```
ras> port pvc usratelimit enable 5-1-0/33
```

## 29.22.7 port pvc usratelimit disable Command

Syntax:

`port pvc usratelimit disable <pvc>`

This command deactivates upstream rate limiting on the PVC.

## 29.22.8 port pvc usratelimit set Command

Syntax:

`port pvc usratelimit set <pvc> <rate>`

This command sets the maximum upstream rate (in Kbps) the PVC is allowed to use. The following example sets the maximum PVC upstream rate to 1000 Kbps on port 1 of the line card in slot 5.

```
ras> port pvc usratelimit enable 5-1-0/33
ras> port pvc usratelimit set 5-1-0/33 1000
ras> port pvc usratelimit show 5-1
pvc            en   rate
-------------- ---- --------------
5-1-0/33         V    1000(kbps)
```

## 29.22.9 port pvc usratelimit show Command

Syntax:

`port pvc usratelimit show <pvc>`

This command displays upstream rate limiting settings on a PVC. The following example shows the PVC rate settings on port 1 of the line card in slot 5.

```
ras> port pvc usratelimit show 5-1
pvc            en   rate
-------------- ---- --------------
5-1-0/33         -    1000(kbps)
```

## 29.22.10 port pvc vlan Command

Syntax:

`port pvc vlan <slot-port-vpi/vci> <vid> <registration> <tag>`

where

| | | |
|---|---|---|
| *<slot-port-vpi/vci>* | = | The slot and port(s) and VPI/VCI of the PVC. |
| *<vid>* | = | The VLAN ID. Valid parameter range = [1 – 4094].<br>This must be the VLAN ID of a VLAN that is already configured. The ports specified in this command must also be set to the fixed status in the VLAN. |
| *<registration>* | = | The VLAN membership setting.<br>`join`: Adds the PVC to the VLAN.<br>`leave`: Removes the PVC from the VLAN. |
| *<tag>* | = | The VLAN tagging setting.<br>`tag`: The specified port(s) accept only incoming Ethernet frames that have a VLAN tag.<br>`untag`: The specified port(s) accept only incoming Ethernet frames that do not have a VLAN tag. |

This command adds a PVC to a VLAN or removes a PVC from a VLAN. It also sets whether the PVC sends frames with or without a VLAN tag.

The following example adds the PVC on DSL port 5 on the line card in slot 7 with VPI 8 and VCI 35 to VLAN 23.

```
ras> port pvc vlan 7-5-8/35 23 join untag
```

# 29.23 port shdsl Commands

Use the `port shdsl` commands to configure the subscriber SHDSL ports.

## 29.23.1 port shdsl alarmprof Command

Syntax:

`port shdsl alarmprof <slot-port> span|stuc|stur|* <alarmprofile>`

where

| | | |
|---|---|---|
| `span\|stuc\|stur\|*` | = | `span`: Sets the alarm profile for the whole span. This is the entire connection including any SHDSL regenerators that might be located between the STU-C (SHDSL Termination Unit - Central) and STU-R (SHDSL Termination Unit - Remote) end points. An SHDSL regenerator amplifies the SHDSL signal in order to increase the connection distance.<br>`stuc`: Sets the alarm profile at STU-C (SHDSL Termination Unit - Central) end point<br>`stur`: Sets the alarm profile at STU-R (SHDSL Termination Unit - Remote) end point<br>`*`: Sets alarm profile at both STU-C and STU-R |
| *<alarmprofile>* | = | The name of an SHDSL alarm profile. |

This command sets the specified SHDSL port(s) or end point(s) to use an alarm profile.

The following example sets SHDSL port 8 on the line card in slot 6 to use the SESalarm alarm profile at both the STU-C and the STU-R.

```
ras> port shdsl alarmprof 6-8 * SESalarm
```

## 29.23.2 port shdsl pbo Command

Syntax:

`port shdsl pbo <slot-port> normal_epl|forced_epl|forced_no_epl <value>`

where

| | | |
|---|---|---|
| `normal_epl\|forced_epl\|forced_no_epl` | = | `normal_epl`: Power backoff with EPL (Estimated Power Loss). Each end calculates an EPL and uses it in determining a power backoff value for the other end to use.<br>`forced_epl:` Forced power backoff with EPL. The STU-C calculates an EPL and uses it in determining the power backoff values for both ends. This can be used when the STU-R device does not support EPL.<br>`forced_no_epl`: Forced power backoff without EPL. The STU-C uses the value you specify in determining the power backoff values for both ends. This can be used when you have prior knowledge about the physical line (loop). |
| <*value*> | = | This sets the 0~31 in dB.<br>When using `nornal_epl` or `forced_epl`, this sets the maximum power backoff value.<br>When using `forced_no_epl`, this sets the power backoff value. |

This command sets the power backoff feature setting on the specified SHDSL port(s). Power backoff calculates how much power is needed for the connection. This allows the STU-C and STU-R to use only enough power for the port's maximum transmission rate (configured in the SHDSL profile). You can normally just leave the default setting (`normal_epl`), you only need to use this command if the STU-R does not support EPL or you need to configure the port to use a specific power backoff setting.

This example sets SHDSL port 7 on the line card in slot 6 to use 13 dB of power backoff for both downstream and upstream.

```
ras> port shdsl pbo 6-7 forced_no_epl 13
```

## 29.23.3 port shdsl pmms Command

Syntax:

`port shdsl pmms <slot-port> <mode>`

where

| | | |
|---|---|---|
| <*mode*> | = | The PMMS (Power Measurement Modulation Session) mode specifies how the target noise margin value is acquired.<br>`normal:` Negotiated target noise margin mode. Each end of the connection determines the target noise margin to be used by the other end for the evaluation of the PMMS results.<br>`forced:` Forced target noise margin mode. The upstream and downstream parameters are set according to the target noise margin value set in the SHDSL profile. |

This command sets the PMMS (Power Measurement Modulation Session) mode of the specified SHDSL port(s).

The following example sets SHDSL port 8 on the line card in slot 6 to use the negotiated target noise margin mode.

```
ras> port shdsl pmms 6-8 normal
```

### 29.23.4 port shdsl set Command

Syntax:

`port shdsl set <slot-port> <profile>`

where

`<profile>` = The SHDSL profile that will define the settings of this port.

This command assigns a specific profile to an SHDSL port(s). The profile defines the maximum and minimum transmission rates, the regional setting, the number of wire pairs to be used, whether line-probing is enabled or disabled and the target and worst case noise margins.

The following example sets SHDSL port 8 on the line card in slot 6 to use the gold profile.

```
ras> port shdsl set 6-8 gold
```

## 29.24 port show Command

Syntax:

`port show <slot>|<slot-port>`

This command displays the settings of the specified port(s). An example is shown next.

```
ras> port show 7-5
port 7-5
  name        :
  tel. no     :
  profile     : DEFVAL
  alrm prof   : DEFVAL
  state       : enable              mode        : auto
  power mgmt  : disable             annexl      : disable
  annexm      : disable             annexi      : disable
  power adap. : fix                 max_us_txpwr: 10.0   dBm
  max_ds_txpwr: 10.0   dBm          max_rxpower : 10.0   dBm
  us_inpmin   : 3                   ds_inpmin   : 3
  option_mask : 0x0000              uscarrier   : 00000000 00000000
  dscarrier (255~32) :
  00000000 00000000   00000000 00000000   00000000 00000000   00000000
  dscarrier (512~256) :
  00000000 00000000   00000000 00000000   00000000 00000000   00000000 00000000
```

## 29.25 port sip set Command

Syntax:

`port sip set <slot-port> <sip-profile> <svc-profile> [<dsp-profile>]`

where

| | | |
|---|---|---|
| <*sip-profile*> | = | The name of a SIP profile. |
| <*svc-profile*> | = | The name of a call service profile. |
| <*dsp-profile*> | = | The name of a digital signal processing profile. |

This command sets a port on the VoIP line card to use the specified SIP, call service and DSP profiles. By default, the VoIP line card's ports use the profile "DEFVAL" for all three kinds of profile.

The following example sets port 5 in card 4 to use the "sip123" SIP profile and the "svc456" call service profile.

```
ras> port sip set 4-5 sip123 svc456
```

## 29.26 port sip opmode Command

Syntax:

`port sip opmode <slot-port> <DEFVAL|v5sip>`

where

| | | |
|---|---|---|
| DEFVAL | = | Configures the port to use SIP to connect to a server. |
| v5sip | = | Configures the port to use V5.2 to connect to a traditional class 5 POTS switch. |

This command sets the operation mode of a VoIP port.

The following example sets card 3's port 5 to use V5.2.

```
ras> port sip opmode 3-5 v5sip
```

## 29.27 port tel Command

Syntax:

`port tel <slot-port> <telephone-no>`

where

| | | |
|---|---|---|
| <*telephone-no*> | = | The subscriber's telephone number. |

This command records a subscriber's telephone number for the specified port(s). On the VOP line card, each port's telephone number is a SIP URI identity (SIP phone number) and must be unique.

The following example records a telephone number of 123456789 for port 5 on the line card in slot 3.

```
ras> port tel 3-5 123456789
```

## 29.28 Transparent LAN Service (TLS)

Transparent LAN Service (also known as VLAN stacking or Q-in-Q) allows a service provider to distinguish multiple customers VLANs, even those with the same (customer-assigned) VLAN ID, within its network. Refer to Section 11.8.6 on page 209 for more information.

Use the `port tlspvc` commands to configure VLAN stacking settings for the specified PVC(s).

You can NOT configure PPPoA-to-PPPoE and TLS settings on the same PVC.

### 29.28.1 port tlspvc delete Command

Syntax:

`port tlspvc delete <slot-port-vpi/vci>`

This command clears TLS settings for the PVC.

### 29.28.2 port tlspvc set Command

Syntax:

`port tlspvc set <slot-port-vpi/vci> <profile> llc|vcmux <vid> <priority>`

where

| | | |
|---|---|---|
| `<profile>` | = | Name of an ATM profile. |
| `llc\|vcmux` | = | Encapsulation method (llc or vcmux). |
| `<vid>` | = | The VLAN ID the switch adds to the traffic on the PVC. This is the VLAN ID known in the service provider's network. |

Note: Make sure this VLAN ID is not already used for MVLAN or PAE.

This command sets the second VLAN tag to add to the packets from the PVC.

The following example adds a VLAN tag (`100`) to the traffic using the `DEFVAL` ATM profile on PVC (`1/33`) on port `2` of the line card in slot `3`.

```
ras> port tlspvc set 3-2-1/33 DEFVAL llc 100 12
```

### 29.28.3 port tlspvc show Command

Syntax:

`port tlspvc show <slot>|<slot-port>|<slot-port-vpi/vci>`

This command displays the TLS settings for the specified slot/port/PVC.

```
ras> port tlspvc show 3-2
pvc              type   mux   pvid  pri  profile
-------------- ------- ----- ------ ---- -------------------
3-2-1/33           tls  llc     100    1 DEFVAL
ras>
```

## 29.29 port vdsl Commands

Use the `port vdsl` commands to configure the subscriber VDSL ports.

### 29.29.1 port vdsl alarmprof Command

Syntax:

`port vdsl alarmprof <slot-port> <profile>`

This command sets the VDSL port(s) to use the specified alarm profile.

### 29.29.2 port vdsl frametype Command

Syntax:

`port vdsl frametype <slot-port> <all|tag>`

where

| | | |
|---|---|---|
| `<all\|tag>` | = | Sets the selected VDSL port(s) to accept VLAN tagged and untagged Ethernet frames or only tagged. |

This command sets the acceptable frame type on the VDSL port(s).

The following example sets port 5 on the VDSL card in slot 4 to accept both tagged and untagged VLAN frames.

```
ras> port vdsl frametype 4-5 all
```

### 29.29.3 port vdsl frequencyplan Command

Syntax:

`port vdsl frequencyplan <slot-port> <997|998>`

where

| | | |
|---|---|---|
| `<997\|998>` | = | Selects a band plan to use. For symmetric connections, use 997.[A] For asymmetric connections, enter 998. |

A. Band plan 997 is not supported at the time of writing.

This command sets the band plan the VDSL port(s) uses.

The following example shows the configuration of port 5 on the VDSL card in slot 4 for an asymmetric connection.

```
ras> port vdsl frequencyplan 4-5 998
```

## 29.29.4 port vdsl inpmin Command

Syntax:

`port vdsl inpmin <slot-port> <us-inp> <ds-inp>`

where

| | | |
|---|---|---|
| *<us-inp>*<br>*<ds-inp>* | = | *us-inp, ds-inp*: The upstream and downstream impulse noise protection setting. Input 0~160 to set the DMT level to 0.1 of the input value. For example, an input value of 10 sets the actual DMT value to 1. Input values 1~4 (0.1~0.4 DMT) are not valid. |

This command configures impulse noise protection settings on a VDSL connection.

The following example sets the upstream noise protection at 1 DMT on traffic on port 5 on the VDSL card in slot 4.

```
ras> port vdsl inpmin 4-5 us-inp 10
```

## 29.29.5 port vdsl ipqos Command

Syntax:

`port vdsl ipqos <slot-port> <profile>`

where

| | | |
|---|---|---|
| *<profile>* | = | The IP QOS profile specified using the `profile ipqos` command. |

This command configures QoS (quality of service) settings on a line card's port.

The following example sets QoS according to settings configured in the profile named "qosprofile1" on traffic on port 5 on the VDSL card in slot 4.

```
ras> port vdsl ipqos 4-5 qosprofile1
```

## 29.29.6 port vdsl optionmask Command

Syntax:

`port vdsl optionmask <slot-port> <option-mask>`

where

<*option-mask*> = The PSD mask value for the option bit.

This command sets the PSD mask for the option bit on the specified port.

The following example enables Trellis coding on traffic on port 5 on the VDSL card in slot 4.

```
ras> port vdsl optionmask 4-5 0x0001
```

## 29.29.7 port vdsl limitmask set Command

Syntax:

`port vdsl limitmask set <slot-port> <limitmask>`

where

<*limitmask*> = The PSD (Power Spectrum Density) mask.
*limitmask*:
1: VDSL2_A_NUS0
2~11: VDSL2_A_EU[32,36,40,44,48,52,56,60,64,128]
12: VDSL1_FTTEX_ANSI_M1
13: VDSL1_FTTEX_ANSI_M2
14: VDSL1_FTTCAB_ANSI_M1
15: VDSL1_FTTCAB_ANSI_M2
16: VDSL1_FTTEX_ANSI_M1_e
17: VDSL1_FTTEX_ANSI_M2_e
18: VDSL1_FTTCAB_ANSI_M1_e
19: VDSL1_FTTCAB_ANSI_M2_e
20: VDSL2_A_CT
21~36: VDSL2_B8_[1..16]
37~46: VDSL2_B7_[1..10]
47: VDSL2_BT_ANFP
48: VDSL2_C_138_b
49: VDSL2_C_276_b
50: VDSL2_C_138_co
51: VDSL2_C_276_co
Four additional customer-defined PSD shapes can be configured per system.

This command sets the PSD mask for the option bit on the specified port.

The following example sets the PSD mask to “VDSL2_A_NUS0” on traffic on port 5 on the VDSL card in slot 4.

```
ras> port vdsl limitmask set 4-5 1
```

## 29.29.8 port vdsl limitmask show Command

Syntax:

`port vdsl limitmask show <limit_mask>`

where

| | | |
|---|---|---|
| <*limtmask*> | = | The PSD (Power Spectrum Density) mask.<br>*limitmask*:<br>1: VDSL2_A_NUS0<br>2~11: VDSL2_A_EU[32,36,40,44,48,52,56,60,64,128]<br>12: VDSL1_FTTEX_ANSI_M1<br>13: VDSL1_FTTEX_ANSI_M2<br>14: VDSL1_FTTCAB_ANSI_M1<br>15: VDSL1_FTTCAB_ANSI_M2<br>16: VDSL1_FTTEX_ANSI_M1_e<br>17: VDSL1_FTTEX_ANSI_M2_e<br>18: VDSL1_FTTCAB_ANSI_M1_e<br>19: VDSL1_FTTCAB_ANSI_M2_e<br>20: VDSL2_A_CT<br>21~36: VDSL2_B8_[1..16]<br>37~46: VDSL2_B7_[1..10]<br>47: VDSL2_BT_ANFP<br>48: VDSL2_C_138_b<br>49: VDSL2_C_276_b<br>50: VDSL2_C_138_co<br>51: VDSL2_C_276_co<br>Four additional customer-defined PSD shapes can be configured per system. |

The following example shows the PSD mask for “VDSL2_A_NUS0”.

```
ras> port vdsl limitmask show 1
                      1 (vdsl2_a_nus0)
Upstream Band Plan
 Index             1        2        3        4
----------- -------- -------- -------- --------
Start tone       880     1981     5343
Stop tone       1196     2773     6947
Downstream Band Plan
 Index             1        2        3        4
----------- -------- -------- -------- --------
Start tone        33     1216     2793
Stop tone        859     1961     5323
Downstream Breakpoints
 Index          1       2       3       4       5       6       7       8
----------- ------- ------- ------- ------- ------- ------- ------- -------
 Bp              33      65     256     376     512     819     859    1216
 psd(dBm)     -58.0   -40.0   -40.0   -50.0   -51.5   -53.2   -58.2   -57.2

 Index          9      10      11      12
----------- ------- ------- ------- ------- ------- ------- ------- -------
 Bp            1245    1961    2793    5323
 psd(dBm)     -55.0   -55.0   -60.0   -60.0

Upstream Breakpoints
 Index          1       2       3       4       5       6
----------- ------- ------- ------- ------- ------- ------- ------- -------
 Bp             880    1196    1981    2773    5343    6947
 psd(dBm)     -53.0   -53.0   -54.0   -54.0   -60.0   -60.0
```

## 29.29.9 port vdsl priority Command

Syntax:

`port vdsl priority <slot-port> <priority>`

This command sets the VDSL port(s) VLAN priority (0 - 7).

## 29.29.10 port vdsl pvid Command

Syntax:

`port vdsl pvid <slot-port> <vid>`

This command sets the VLAN ID on the VDSL port(s).

## 29.29.11 port vdsl pvlan set Command

Syntax:

`port vdsl pvlan <slot-port> <etype> <vid> <priority>`

where

| | | |
|---|---|---|
| `<etype>` | = | The ether type in hexadecimal. |
| `<vid>` | = | The VLAN ID from `1~4094` |
| `<priority>` | = | The priority setting from 0~7 |

This command sets a private VLAN setting on a specified DSL port. The following example sets up a private VLAN with an IPv6 Ethernet type, an ID of 1 and a priority of 1 on traffic on port 5 on the VDSL card in slot 4.

```
ras> port vdsl pvlan 4-5 86DD 1 1
```

## 29.29.12 port vdsl rfiband Command

Syntax:

`port vdsl rfiband <slot-port> <disable|ansi|etsi|custom>`

where

| | | |
|---|---|---|
| `<disable\|ansi\|etsi\|custom>` | = | Enter `ansi` or `etsi` to use the pre-defined RFI band.<br>Enter `disable` to deactivate this feature.<br>Enter `custom` to use the RFI band settings configured using the `port vdsl rficustom` command. |

Use this command to specify an RFI mode or disable this feature.

## 29.29.13 port vdsl rficustom Commands

Syntax:

```
port vdsl rficustom disable <index>
port vdsl rficustom enable <index>
port vdsl rficustom set <index> <start_freq> <stop_freq>
port vdsl rficustom show
```

where

| | | |
|---|---|---|
| *<index>* | = | This is index number (1-8) of the custom RFI entry. |
| *<start_freq>* | = | This is the start of the frequency range in kHz (0~2147483647).<br>Note: *<start_freq>* cannot be bigger than *<stop_freq>*. |
| *<stop_freq>* | = | This is the end of the frequency range in kHz. |

Use these commands to configure or display the settings of a custom RFI entry.

An example is show below:

- Creates a custom RFI entry with the frequency between 3500 and 3800 kHz.
- Activate the settings.
- Show the settings.

```
ras> port vdsl rficustom set 1 3500  3800
ras> port vdsl rficustom enable 1
ras> port vdsl rficustom show
 index   state   start_freq   stop_freq
------- ------- ------------ -----------
      1      V         3500        3800
      2      -            0           0
      3      -            0           0
      4      -            0           0
      5      -            0           0
      6      -            0           0
      7      -            0           0
      8      -            0           0
ras>
```

## 29.29.14 port vdsl set Command

Syntax:

```
port vdsl set <slot-port> <profile> <vdsl_profile>
```

where

| | | |
|---|---|---|
| *<profile>* | = | Sets the custom line profile. |
| *<vdsl_profile>* | = | Sets the standard band plan profile (8a \| 8b \| 8c \| 8d \| 12a). |

Use this command to set the VDSL line and band plan profiles the port(s) use.

The following example sets port 5 on the VDSL card in slot 4 to use the DEFVAL line profile and the standard 8b band plan profile.

```
ras> port vdsl set 4-1 DEFVAL 8b
```

## 29.29.15 port vdsl tls Commands

Syntax:

```
port vdsl tls disable <slot-port>
port vdsl tls enable <slot-port>
port vdsl tls set <slot-port> <svid> <spriority>
```

where

| | | |
|---|---|---|
| *<svid>* | = | Sets the service provider ID (from 1 to 4094) to add on frames received. |
| *<spriority>* | = | Sets the priority level (from 0 to 7) for the service provider's VLAN ID. |

Use these commands to configure Transparent LAN Service (TLS) settings on the VDSL port(s).

The following shows an example.

- Enables TLS on port 5 on the VDSL line card in slot 4.
- Configures the service provider's VID to 10 and VLAN priority to 7 (highest priority).

```
ras> port vdsl tls enable 4-5
ras> port vdsl tls set 4-5 10 7
```

## 29.29.16 port vdsl upbo Commands

Syntax:

```
port vdsl upbo <slot-port> <on|off>
```

This command enables or disables Upstream Power Back Off (UPBO) on the VDSL port(s). UPBO allows the switch to provide better service in a network environment with telephone wiring of varying lengths.

The following example enables UPBO on all ports on VDSL line card in slot 4.

```
ras> port vdsl upbo 4-* on
```

## 29.29.17 port vdsl vlan Commands

Syntax:

```
port vdsl vlan <slot-port> <vid> <registration> <tag>
```

where

| | | |
|---|---|---|
| *<vid>* | = | Enter a VID (VLAN ID) to add this channel as a member.<br>This must be the VLAN ID of a VLAN that is already configured. The port that you are configuring must also be set to the fixed status in the VLAN. |
| *<registration>* | = | Enter `join` to have the port be a member of the specified VLAN.<br>Enter `leave` to remove the port from the specified VLAN. |
| *<tag>* | = | Enter `tag` to add a tag to all frames transmitted on this port.<br>Enter `untag` to not add tags. |

This command sets the port VLAN settings on the VDSL port(s).

The following example sets the VDSL port 5 on the line card in slot 4 to join VLAN 5. The port also adds a tag to frames.

```
ras> port vdsl vlan 4-5 5 join tag
```

# 30

# profile Commands

This chapter shows you how to use the `profile` commands.

## 30.1 Profiles Overview

Profiles are groups of settings that you can assign to a port(s). This helps simplify and speed up port configuration.

## 30.2 General profile Command Parameters

The following table describes commonly used `profile` command parameter notation.

**Table 238** General profile Command Parameters

| NOTATION | DESCRIPTION |
|---|---|
| *profile* | The profile name, up to 31 characters.<br>Alarm profile settings<br>`atuc`: near end<br>`atur`: far end<br>*`lofs`*: The maximum time there is loss of framing (0~900 seconds).<br>*`loss`*: The maximum time there is a loss of signal (0~900 seconds).<br>*`lols`*: The maximum time there is a loss of link (0~900 seconds).<br>*`lprs`*: The maximum time there is a loss of power (0~900 seconds).<br>*`ess`*: The maximum time there is error (0~900 seconds).<br>*`ffr`*: The maximum time there are failed fast retrains (0~900 seconds).<br>*`sesl`*: The maximum time there are severe errors on the line (0~900 seconds).<br>*`uasl`*: The maximum time there the line is unavailable (0~900 seconds).<br>*`fru`*: The maximum transmission rate (0~2147483 Kbps).<br>*`iru`*: The maximum interleave rate (0~2147483 Kbps).<br>*`frd`*: The minimum transmission rate (0~2147483 Kbps).<br>*`ird`*: The minimum interleave rate (0~2147483 Kbps).<br>*`ift`*: Enables (1) or disables (0) the init failure trap. |

## 30.3 profile Commands Summary

The following table lists the `profile` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 239** profile Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `profile` | `acl` | `set` | *<name> <rule> <action>* | Adds or edits an ACL profile. See Section 30.4.3 on page 598 for more information. | M |
| | | `delete` | *<profile>* | Deletes an ACL profile. | M |
| | | `show` | `[`*profile*`]` | Displays ACL profile settings. | M |
| | | `map` | *<profile>* | Displays which ports reference this ACL profile. | L |
| | `adsl` | `delete` | *<profile>* | Removes an unreferenced ADSL port settings profile. | M |
| | | `map` | *<profile>* | Displays which ADSL ports reference this profile. | L |
| | | `set` | *<profile> <us-max-rate> <ds-max-rate>* `[fast\|delay` *<us-delay> <ds-delay>*`][`*minrate <us-min-rate> <ds-min-rate>*`] [usmgn` *<us-max-mgn> <us-min-mgn> <us-tgt-mgn>*`][dsmgn` *<ds-max-mgn> <ds-min-mgn> <ds-tgt-mgn>*`] [usra fixed\|startup\|runtime` *<us-us-mgn> <us-ds-mgn>*`][dsra fixed\|startup\|runtime` *<ds-us-mgn> <ds-ds-mgn>*`]` | Creates a profile of ADSL port settings.<br>*us-max-rate*: Upstream maximum rate (64~4096 in Kbps).<br>*ds-max-rate:* Downstream maximum rate (64~32000 in Kbps).<br>*us-delay*/*ds-delay*: Upstream/ downstream delay (1~255 in ms).<br>*us-min-rate*: Upstream minimum rate (32~4096 in Kbps).<br>*ds-min-rate*: Downstream minimum rate (32~32000 in Kbps).<br>*us-max-mgn*: Maximum noise margin (0~310 in 0.1 dB).<br>*ds-min-mgn*: Minimum noise margin (0~310 in 0.1 dB).<br>*ds-tgt-mgn*: Target noise margin (0~310 in 0.1 dB).<br>`fixed:` no rate adaptation<br>`startup:` rate adaptation at initialization<br>`runtime`: rate adaptation any time<br>*ds-us-mgn*: up shift noise margin (0~310 in 0.1 dB).<br>*ds-ds-mgn*: us/ds down shift noise margin (0~310 in 0.1 dB). | M |
| | | `show` | `[`*<profile>*`]` | Lists the ADSL configuration profiles or a specific profile's detailed settings. | L |
| | `alarmadsl` | `delete` | *<profile>* | Removes an unreferenced ADSL alarm profile. | M |
| | | `map` | *<profile>* | Displays which ADSL ports reference this alarm profile. | L |

**Table 239** profile Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | set | <*profile*> atuc [lofs <*lofs*>] [loss <*loss*>] [lols <*lols*>] [lprs <*lprs*>] [ess <*ess*>] [ffr <*ffr*>] [sesl <*sesl*>] [uasl <*uasl*>] [fru <*fru*>] [iru <*iru*>] [frd <*frd*>] [ird <*ird*>] [ift <*ift*>] or <profile> atur [lofs <*lofs*>] [loss <*loss*>] [lprs <*lprs*>] [ess <*ess*>] [sesl <*sesl*>] [uasl <*uasl*>] [fru <*fru*>][iru <*iru*>][frd <*frd*>] [ird <*ird*>] | Creates a profile of ADSL alarm settings. | M |
| | | show | [<*profile*>] | Lists the ADSL alarm profiles or a specific profile's settings. | L |
| | alarmshdsl | delete | <*profile*> | Removes an unreferenced SHDSL alarm profile. | M |
| | | map | <*profile*> | Displays which SHDSL ports reference this alarm profile. | L |
| | | set | <*profile*> [atten <*atten*>] [snrmgn <*snrmgn*>] [es <*es*>] [ses <*ses*>][crc <*crc*>] [losws <*losws*>] [uas <*uas*>] | Creates a profile of SHDSL alarm settings.<br>*atten*: The loop attenuation threshold (0~127).<br>*snrmgn*: The signal-to-noise (SNR) margin threshold (0~15).<br>*es*: The maximum time for errors to occur (0~900 seconds)<br>ses: The maximum time for severe errors to occur (0~900 seconds)<br>*crc*: The maximum number (>=0) of cyclic redundancy check (CRC) anomalies.<br>*losws*: The maximum time for sync word loss to occur (0~900 seconds).<br>*uas*: The maximum number of unavailable seconds (0~900). | M |
| | | show | [<*profile*>] | Lists the SHDSL alarm profiles or a specific alarm profile's settings. | L |
| | alarmadsl | delete | <*profile*> | Removes an unreferenced ADSL alarm profile. | M |

**Table 239** profile Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | map | <*profile*> | Displays which ADSL ports reference this alarm profile. | L |
| | | set | <*profile*> atuc [lofs <*lofs*>] [loss <*loss*>] [lols <*lols*>] [lprs <*lprs*>] [ess <*ess*>] [ffr <*ffr*>] [sesl <*sesl*>] [uasl <*uasl*>] [fru <*fru*>] [iru <*iru*>] [frd <*frd*>] [ird <*ird*>] [ift <*ift*>] or <*profile*> atur [lofs <*lofs*>] [loss <*loss*>] [lprs <*lprs*>] [ess <*ess*>] [sesl <*sesl*>] [uasl <*uasl*>] [fru <*fru*>][iru <*iru*>][frd <*frd*>] [ird <*ird*>] | Creates a profile of ADSL alarm settings. | M |
| | | show | [<*profile*>] | Lists the ADSL alarm profiles or a specific profile's settings. | L |
| | alarmvdsl | | | VDSL alarm profiles allow efficient configuration of VDSL alarm settings. | |
| | | delete | <*profile*> | Removes an unreferenced VDSL alarm profile. | M |
| | | map | <*profile*> | Displays which VDSL ports reference this alarm profile. | L |
| | | set | <*profile*> [lofs <*lofs*>] [loss <*loss*>] [lols <*lols*>] [lprs <*lprs*>] [ess <*ess*>] [ffr <*ffr*>] [sesl <*sesl*>] [uasl <*uasl*>] [fru <fru>] [iru <*iru*>] [frd <*frd*>] [ird <*ird*>] [ift <*ift*>] [cv <*cv*>] | Creates a profile of VDSL alarm settings.<br>*cv*: The maximum number of code violations (CRC errors). | M |
| | | show | [<*profile*>] | Lists the VDSL alarm profiles or a specific profile's settings. | L |

**Table 239** profile Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | atm | delete | <*profile*> | Removes an unreferenced ATM traffic profile. | M |
| | | map | <*profile*> | Displays which ports reference this ATM profile. | L |
| | | set | <*atmprofile*> cbr\|ubr <*pcr*> <*cdvt*><br>or<br><*atmprofile*> rt-vbr\|nrt-vbr <*pcr*> <*cdvt*> <*scr*> <*bt*> | Creates a profile of ATM traffic settings.<br>cbr: constant cell rate<br>ubr: unspecified cell rate<br>rt-vbr: real time variable bit rate<br>nrt-vbr: non-real time variable bit rate<br>*pcr*: peak cell rate (150~300000)<br>*scr*: sustainable cell rate, (150~300000)<br>*cdvt*: cell delay variation tolerance, (0~255).<br>*bt*: burst tolerance (0~255).<br>Note: use "*" to set *pcr*, *cdvt*, *scr* and *bt* to the default value. | M |
| | | show | [<*profile*>] | Lists the ATM traffic profiles or a specific profile's settings. | L |
| | igmpfilter | delete | <*igmpfilter*> | Removes an unreferenced IGMP filter profile.<br>IGMP filter profiles allow you to control access to IGMP multicast groups. | M |
| | | map | <*igmpfilter*> | Displays which ports reference this IGMP filter profile. | L |
| | | set | <*igmpfilter*> <*index*> <*startip*> <*endip*> | Creates an IGMP filter profile of ATM traffic settings.<br>*igmpfilter*: profile name<br>*index*: index of addresses (1~16).<br>*startip*: start of address range<br>*endip*: end of address range | M |
| | | show | [*igmpprofile*] | Lists the IGMP filter profiles or a specific profile's settings. | L |
| | ipqos | delete | <*profile*> | Deletes a specified IPQoS profile.<br>*profile*: The name of a QoS profile configured using the profile command. | M |

**Table 239** profile Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | queue | <*profile*> <*queue-id*> <*pir*> <*cir*> <*pbs*> <*cbs*> | Sets the PIR, CIR, PBS, CBS parameters for an IPQoS profile.<br>*queue-id*: The queue index beginning at 0. For example, if you have configured 4 queues for a profile, then you can enter a *queue-id* from 0 to 3.<br>*pir*: The peak rate (128~32768 kbps in increments of 64 kbps)<br>*cir*: The committed rate (64~16384 kbps in increments of 64 kbps).<br>*pbs*: The peak burst size in bytes ( 3072~65536 kbps in increments of 256 kbps).<br>*cbs*: The committed burst size in bytes (3072~65536 kbps in increments of 256 kbps). | M |
| | | set | <*profile*> <1\|2\|4\|8> | Sets the number of priority queues for a IPQoS profile. You can set 1, 2, 4 or 8 queues. | M |
| | | show | [*profile*] | Displays all configured IPQoS profiles or a specified profile. | L |
| | | map | <*profile*> | Displays which ports reference this IPQoS profile. | M |
| | profsvr | show | | Displays the current profile server setting. | L |
| | | mode | client\|server | Sets the profile server operation mode. | M |
| | | clientlist | set <*ip-address*> <type> | Adds an entry to the profile server client list. | M |
| | | | delete <*ip-address*> | Removes an entry from the profile server client list. | M |
| | | | show | Displays the profile server client list. | L |
| | | serverset | <*ip-address*> | Sets the target profile server IP address for synchronization. | M |
| | | sync | | Synchronizes with the profile server. | M |
| | shdsl | delete | <*profile*> | Removes an unreferenced SHDSL port settings profile. | M |
| | | map | <profile> | Displays which SHDSL ports reference this profile. | L |

**Table 239** profile Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | set | <*profile*> <min-rate> <max-rate> [<*annex*> <*wire_pair*> <*pms*> [*margin*]] | Creates a profile of SHDSL port settings.<br>*min-rate*: The minimum rate (192~4096 Kbps).<br>*max-rate*: The maximum rate (192~4096 in Kbps).<br>*annex*: The regional setting. Choose annexa\|annexb:<br>wire-pair: The number of wire pairs to be used. Choose 2wire\|4wire\|mpair4.<br>*pmms*: Line probing. Options are*:*<br>lp_off: Disables the line probe.<br>lp_on_cur: Enables the line probe based on the current target SNR margin.<br>*lp_on_wc*: Enables the line probe based on the worst case target *snr* margin.<br>*curr-margin*: The current condition target SNR margin (-10~21 dB).<br>*margin*: The current noise margin or worst case noise margin (-10~21 dB). | M |
| | | show | [<*profile*>] | Lists the SHDSL port setting profiles or a specific profile's settings. | L |
| | vdsl | delete | <*profile*> | Removes a VDSL port settings profile. | M |
| | | map | <*profile*> | Displays which VDSL ports reference this profile. | L |

**Table 239** profile Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | set | <*profile*> <*us-max-rate*> <*ds-max-rate*> [fast\|delay <*us-delay*> <*ds-delay*>] [minrate <*us-min-rate*> <*ds-min-rate*>] [usmgn <*us-max-mgn*> <*us-min-mgn*> <*us-tgt-mgn*>] [dsmgn <*ds-max-mgn*> <*ds-min-mgn*> <*ds-tgt-mgn*>] [hamband <*mask*>] [custom1 <start <stop>] [custom2 <start> <stop>] [usinp <*usinp*>] [dsinp <*dsinp*>] [limitmask <*maskid*>] [option <*option*>] [upboesel <*esel*>] [epsd <<*tone*> <*psd*> […]>\|<*psdid*>][esel <*esel*>] [escma <*escma*>] [escmb <*escmb*>][escmc escmc>] [mus<*mus*>][fmin <fmin>] [fmax<*fmax*>] [vdslprofile <*vdslprofile*>] | Creates a VDSL line profile. See Section 30.14.3 on page 620 for more information. | M |
| | | show | [*profile*] | Lists the VDSL port setting profiles or a specific profile's settings. | L |
| | voip dsp | delete | <*name*> | Removes the specified Digital Signal Processing (DSP) profile. | M |
| | | map | <*name*> | Displays the subscribers that reference the specified DSP profile. | L |

**Table 239** profile Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | set | <*name*> [codec <*codec*> [,<*codec*>...] [playbuffer <*min-delay*> <*max-delay*>] [echotail <*echotail*>] [echocancel off\|on] [vad off\|on] [g711vpi <*g711-vpi*>] [g723vpi <*g723-vpi*>] [g726vpi <*g726-vpi*>] [g729vpi <*g729-vpi*>] | This command creates and configures a DSP (Digital Signal Processing) profile.<br>*codec*: Available codecs are:<br>G.711a: g711a<br>G.711µ: g711mu<br>G.723: g723<br>G.726<br>16 kbps: g726-16<br>24 kbps: g726-24<br>32 kbps: g726-32<br>40 kbps: g726-40<br>G.729a & b: g729ab<br>echo-tail: The echo cancellation echo tail period in milliseconds (8, 16, 32 or 128).<br>*min-delay*: The play buffer minimum delay in milliseconds (10 ~ 500). This value should be less than or equal to the max-delay.<br>*max-delay*: The play buffer maximum delay in milliseconds (10 ~ 500). This value should be greater than or equal to the min-delay.<br>echocancel: Echo cancellation.<br>g711-vpi: G.711 voice package interval, 10, 20, 30 or 40 ms.<br>g723-vpi: G.723 voice package interval, 30 or 60 ms.<br>g726-vpi: G.726 voice package interval, 10, 20, 30 or 40 ms.<br>g729-vpi: G.729 voice package interval, 10, 20, 30, 40, 50 or 60 ms.<br>The default profile “DEFVAL” has the following settings:<br>codec: g711a, g711mu<br>play buffer min-delay: 30 ms<br>play buffer max-delay: 120 ms<br>echotail: 32 ms<br>echocancel: on<br>vad: off<br>g711vpi: 20 ms<br>g723vpi: 30 ms<br>g726vpi: 20 ms<br>g729vpi: 20 ms | M |
| | | show | show [*name*] | This command displays the settings of the specified DSP profile, or displays the names of all DSP profiles if none is specified. | L |
| | voip h248 | delete | <*profile*> | Removes the specified H248 profile. | M |
| | | map | [*profile*] | Displays subscribers referenced by all H248 profiles or the specified profile. | L |

**Table 239** profile Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | set | <*profile*> <*mgc-ip*>\|<*mgc-dn*> [*mgcport* <*mgc-port*>][mgc2 off\|{on <*mgc2-ip*>\|<*mgc2-dn*>}] [mgc2port <*mgc2-port*>][transport udp\|tcp][encode long\|short][pbit <*pbit*>][dscp <*dscp*>]<*profile*> | Configures an H.248 profile.<br>See Section 30.16.3 on page 626 for more information on this command.<br>The default H248 profile values are:<br>*name*: DEFVAL<br>*mg-name*: DEFVAL<br>*mg-port*: 2944<br>*mgc-ip*: 127.0.0.1<br>*mgc-port*: 2944<br>*mgc2*: off<br>*mgc2-port*: 2944<br>*transport*: udp<br>*encoding*: long<br>*pbit*: 7<br>*dscp*: 48 | M |
| | | show | [*profile*] | Displays the settings of all H248 profiles or the specified one. | L |
| | voip sip | delete | <*name*> | Removes the specified SIP profile. | M |
| | | dialplan delete | <*profile*> | Removes the specified dial plan profile. | M |
| | | dialplan map | <*profile*> | Displays subscribers referenced by all dial plan profiles or by the specified one. | L |
| | | dialplan set | <*profile*> <*index*> [<*dialplan-table*>] | Configure dial plan related settings of the specified profile.<br><*index*>: The index number for an entry in the dial plan table (1~32).<br><*dialplan-table*>: The dialplan table name (<=31 characters). Use the voip dialplan set command to set up a dialplan. | M |
| | | dialplan show | | Displays the settings of all dial plan profiles or of the specified profile. | L |
| | | map | <*name*> | Displays which ports use the specified SIP profile. | L |

**Table 239** profile Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | set | <*name*> <*sip-ip*>\|<*sip-dn*> <*regsvr-ip*>\|<*regsvr-dn*> <*proxysvr-ip*>\|<*proxysvr-dn*> [sipport <*sip-port*>] [regsvrport <*regsvr-port*>] [proxysvrport <*proxysvr-port*>] [uritype sip\|tel] [pbit <*pbit*>] [dscp <*dscp*>] [keepalive off\|on <*se*>] [prack on\|off] | Configures the specified SIP profile. The system supports up to 128 SIP profiles.<br>*sip-ip*: The SIP server's IP address.<br>*sip-dn*: The SIP server's domain name (maximum 256 characters).<br>*sip-port*: SIP UA port number (1025 ~ 65535).<br>*regsvr-ip*: The SIP registrar server's IP address.<br>*regsvr-port*: The SIP registrar server's port number (1025 ~ 65535).<br>*proxysvr-ip*: The SIP proxy server's IP address (maximum 256 characters).<br>*proxsvr-port*: The SIP proxy server's port number (1025 ~ 65535).<br>uritype sip: Set the SIP profile to use the SIP URI.<br>uritype tel: Set the SIP profile to use the TEL URI.<br>*pbit*: The 802.1p bits for RTP and SIP packets (0 ~ 7).<br>*dscp*: DSCP for RTP and SIP packets (0 ~63).<br>keepalive: Enable (on) or disable (off) the SIP session keepalive. When enabled, the SIP UA periodically sends SIP session refresh requests.<br>*se*: The minimum session expiration time (90 ~ 65535) seconds.<br>prack: Enable (on) or disable (off) the sending of a PRACK (PRovisional ACKnowledgement) in response to a SIP INVITE request. | M |
| | | show | [<*name*>] | Displays the current settings of the specified profile, or displays the names of all profiles if none is specified. | L |
| | | callsvc delete | [<*name*>] | Removes the specified SIP call service profile. | M |
| | | callsvc map | <*name*> | Displays the subscribers that reference the specified call service profile. | L |

**Table 239** profile Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | callsvc set | <*name*> [keypattern <*pattern-table*>] [nopassword \| {password <*password*>} [registration off\|{on [<*re*>]}] [numberplan off\|on {<*cc*> <*ndc*> <*numberplan-table*>}] [localhelp off\|on {<*tel-number*> <*localhelp-table*> [<*tel-number*> <*localhelp-table*>...]}] [dnd on\|off] [dtmf bypass\|rfc2833\|sipinfo\|rfc2833like\|plaintext] [callhold on\|off] [callwait on\|off] [callreturn on\|off] [cidcw on\|off] [clip on\|off] [clir on\|off] [calltransfer on\|off] [fax t38\|g711] [flash invite\|rfc2833\|rfc2833like\|sipinfo1\|sipinfo2\|sipinfo3\|sipinfo4\|{sipinfo5 [<*rc*>]}\|{sipinfo6 [<*si*>]} [localcall on\|off] [mwi on\|off] [reanswer <*ra*>] | Configures a new call service profile.<br>`keypattern`: Enter the VoIP key pattern to use.<br>Once the password configuration is set, it cannot be changed.<br>The system supports up to 128 call service profiles.<br>`nopassword`: No password is needed for SIP registration.<br>`password`: A password is needed for SIP registration.<br>*`password`*: The SIP registration password (maximum 32 characters).<br>`registration`: choose `on` and enter a time period (<re>) to have the system use the registration timeout feature. If the system does not receive a registration confirmation message from the SIP server in the time specified, it drops the connection.<br>Select `off` to not use the registration timeout feature.<br>`numberplan`: Configures whether or not the specified call service profile references a numbering plan and, if so, which numbering plan.<br>`numberplan`: Disable (`off`) or enable (`on`) this feature<br>*`cc`*: Local country code. This defines the digits the numbering plan inserts when a rule contains “\c”.<br>*`ndc`*: Local national destination code. This defines the digits the numbering plan inserts when a rule contains “\d”.<br>*`numberplan-table`*: The name of the numbering plan to use.<br>`localhelp`: Turn the local help table feature on or off. Specify the name of the local help table you want users to access when they call a specific telephone number.<br>`dnd`: Allows (`on`) or prohibits (`off`) the Do not Disturb feature.<br>`bypass`: Sets the system to not relay DTMF signals.<br>`rfc2833`: Sets the system to relay DTMF tones according to RFC2833.<br>`sipinfo`: Sets the system to relay DTMF signals via SIP INFO message.<br>`rfc2833like`: Sets the system to relay DTMF signals via SIP INFO but carrying RFC2833 payload. | M |

**Table 239** profile Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | | | Continued:<br>`callhold`: Allows (`on`) or prohibits (`off`) call holding.<br>`callwait`: Allows (`on`) or prohibits (`off`) call waiting.<br>`callreturn`: Call return allowed/ prohibited.<br>`cidcw`: Calling Identity Delivery on Call Waiting allowed/prohibited.<br>`clip`: Allows (`on`) or prohibits (`off`) caller ID presentation.<br>`clir`: Allows (`on`) or prohibits (`off`) caller ID restriction.<br>`calltransfer`: Allows (`on`) or prohibits (`off`) call transferring.<br>`g711`: Sets the system to relay fax signals via ITU-T G.711.<br>`t38`: Sets the system to relay fax signals via ITU-T T.38.<br>`flash`: Select the method the system uses to process the flash signal from a user.<br>`invite`: relays flash by SIP INVITE signal.<br>`rfc2833`: relays flash according to RFC 2833.<br>`rfc2833like`: relays flash in SIP INFO packets, but carried as RFC 2833 payload<br>`sipinfo1`: relays flash in SIP INFO packets (a `signal=16` message)<br>`sipinfo2`: relays flash in SIP INFO packets (a `signal=hf` message)<br>`sipinfo3`: relays flash in SIP INFO packets (a `signal=hook-flash` message)<br>`sipinfo4`: relays flash in SIP INFO packets (a plain text “FLASH” message).<br>`sipinfo5`: relays flash in SIP INFO packets (multiple SIP messages). The message content is determined by the characters you enter for `<rc>`. A separate SIP INFO message is sent for each character you enter.<br>`sipinfo6`: relays flash in SIP INFO packets (where the content of the message is determined by the text you enter for `<si>`).<br>`localcall`: Sets whether or not to allow subscribers to call other subscribers if the system’s connection to the SIP server is not available. | |

**Table 239** profile Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | | | `mwi:` Turns the message waiting indicator on or off.<br>`reanswer`: When the system is using v5sip mode, use this field to set the reanswer time period. The reanswer time controls the length of time between the user hanging up the phone, and the call being disconnected (the BYE request being sent). | |
| | | `callsvc show` | `[<name>]` | Displays details of the specified call service plan, or the names of all configured profiles if no name specified. | L |

# 30.4 profile acl Commands

An ACL (Access Control Logic) profile allows the system to classify and perform actions on the upstream traffic.

## 30.4.1 profile acl delete Command

Syntax:

`profile acl delete <profile>`

This command removes the specified ACL profile.

You cannot remove the ACL profile(s) that is currently in use.

## 30.4.2 profile acl map Command

Syntax:

`profile acl map <profile>`

This command displays the DSL port(s) to which the specified ACL profile is applied.

The following example displays the port mapping table for the `example` ACL profile.

```
ras> profile acl map example
 port pvc
----- ------------------------------------------------------
 3- 1 0-33
```

## 30.4.3 profile acl set Command

Syntax:

`profile acl set <name> <rule> <action>`

where:

`<rule>` = The rule that classifies traffic flows. Ordering of the criteria is important. The system first compares the layer 2 fields first, the layer 3 fields and then the protocol type.

The following lists the set of criteria you can configure. Note that the device takes the order when matching rules.

1. `etype <0~65535> vlan <1~4094>`
2. `etype <0~65535> smac <mac-address>`
3. `etype <0~65535> dmac <mac-address>`
4. `vlan <1~4094> smac <mac-address>`
5. `vlan <1~4094> dmac <mac-address>`
6. `smac <mac-address> dmac <mac-address>`
7. `vlan <1~4094> priority <0~7>`
8. `etype <0~65535>`
9. `vlan <1~4094>`
10. `smac <mac-address>`
11. `dmac <mac-address>`
12. `priority <0~7>`
13. `protocol <protocol>`
14. `vlan <1~4094> sip <ip-address>`
15. `vlan <1~4094> dip <ip-address>`
16. `vlan <1~4094> sport tcp|udp <port>`
17. `vlan <1~4094> dport tcp|udp <port>`
18. `{srcip <ip-address>/<mask>{|dstip <ip-address>/<mask>{|tos <stos> <etos>{|srcport <sport> <eport> {|dstport <sport> <eport>}}}}}`

where

- `etype <0~65535>`: Ethernet type.
- `vlan <1~4094>`: VLAN ID.
- `smac <mac>`: Source MAC address.
- `dmac <mac>`: Destination MAC address.
- `protocol <protocol>`: Protocol type: `tcp`, `udp`, `ospf`, `igmp`, `ip`, `gre`, `icmp` or user specified (0~255).
- `dstip <ip-address>/<mask>`: Destination IP address and subnet mask (0~32).
- `srcip <ip-address>/<mask>`: Source IP address and subnet mask (0~32).
- `tos <stos> <etos>`: Sets the ToS (Type of Service) range between 0 and 255.
- `dstport <sport> <eport>`: Destination port range.
- `srcport <sport> <eport>`: Source port range.

Note:

- VLC1224G-41 does not support rule 14.
- VLC1324G-51 does not support rule 14.
- Only one rate limit through ACL per PVC or per port.

`<action>` = The action(s) to perform on the classified packets. The following lists the actions you can set.

`rate <64~40960>`: Sets the rate limit (in kbps) for the matched traffic. Set this rate in multiples of 64. For example, set it to 960 or 1024 instead of 1000.

`rvlan <1~4094>`: Replaces the VLAN ID with the specified VLAN ID.

`rpri <0~7|deny>`: Replaces the priority with the specified priority of the matched packets or drops (`deny`) the packets.

You must also specify `rpri <0~7|deny>` when you set `rvlan <1~4094>`.

This command configures an ACL rule to classify the upstream traffic and perform action(s) on the classified traffic.

The following creates an ACL rule example named `test` for traffic from VLAN 10 with a priority level of 2. This rule limits the rate on the classified traffic to 1024 kbps and changes the priority level to 7.

```
ras> profile acl set test vlan 10 priority 2 rate 1024 rpri 7
```

#### 30.4.3.1 Configuration Guidelines

- You can apply one classifier for a protocol on a port's PVC.
- You cannot create a classifier that contains matching criteria for layer 2 and layer 3 fields. For example `profile acl set test protocol tcp vlan 15 deny` is not allowed as protocol type and VLAN do not belong to the same network layer.
- Each type of criteria can only be used once in a classifier. For example, `profile acl set test protocol tcp protocol udp deny` is not allowed. For this example, you need to create a separate classifier for each protocol and apply them to the same PVC(s).

### 30.4.4 profile acl show Command

Syntax:

`profile acl show [<profile>]`

This command displays the name(s) of the profile(s) you have configured.

```
ras> profile acl show
acl profile(s):
--------------
1. example
ras>
```

## 30.5 profile adsl Commands

Use the `profile adsl` commands to configure ADSL profiles.

### 30.5.1 profile adsl set Command

Syntax:

```
profile adsl set <profile> <us-max-rate> <ds-max-rate>
 [fast|delay <us-delay> <ds-delay>]
 [minrate <us-min-rate> <ds-min-rate>]
 [usmgn <us-max-mgn> <us-min-mgn> <us-tgt-mgn>]
 [dsmgn <ds-max-mgn> <ds-min-mgn> <ds-tgt-mgn>]
 [usra fixed|startup|runtime <us-us-mgn> <us-ds-mgn>]
 [dsra fixed|startup|runtime <ds-us-mgn> <ds-ds-mgn>]
```

where

| | | |
|---|---|---|
| *<profile>* | = | The descriptive name for the profile. |
| *<us-max-rate>* | = | The maximum ADSL upstream transmission rate, 64~4096 in Kbps. The upstream rate must be less than or equal to the downstream rate. |
| *<ds-max-rate>* | = | The maximum ADSL downstream transmission rate, 64~32000 in Kbps. |
| [fast\|delay *<us-delay>* *<ds-delay>*] | = | The latency mode. With interleave, you must also define the upstream and downstream delay (1-255 ms). It is recommended that you configure the same delay for both upstream and downstream. |
| [minrate *<us-min-rate>* *<ds-min-rate>*] | = | The minimum ADSL upstream transmission rate (32~4096 Kbps) and the minimum ADSL downstream transmission rate (32~32000 Kbps). |
| [usmgn *<us-max-mgn>* *<us-min-mgn>* *<us-tgt-mgn>*] | = | The maximum, minimum and target acceptable ADSL upstream signal to noise margins (0~310 in 0.1 dB measurements). |
| [dsmgn *<ds-max-mgn>* *<ds-min-mgn>* *<ds-tgt-mgn>*] | = | The maximum, minimum and target acceptable ADSL downstream signal to noise margins (0~310 in 0.1 dB measurements). |
| *usra* | = | The upstream rate adaptation setting.<br>`fixed`: no rate adaptation<br>`startup`: rate adaptation at initialization<br>`runtime`: rate adaptation any time |
| *dsra* | = | The downstream rate adaptation setting. |
| *<us-us-mgn>* | = | The upstream up shift noise margin (0~310 in 0.1 dB). |
| *<us-ds-mgn>* | = | The upstream down shift noise margin (0~310 in 0.1 dB). |
| *<ds-us-mgn>* | = | The downstream up shift noise margin (0~310 in 0.1 dB). |
| *<ds-ds-mgn>* | = | The downstream down shift noise margin (0~310 in 0.1 dB). |

The profile is a list of ADSL line configuration settings. After you create an ADSL profile, you can assign it to any of the ADSL ports on any of the ADSL line cards.

Note that the default value will be used for any of the above fields that are omitted.

The ADSL up/down shift noise margins define the threshold that triggers rate adaptation. For example:

The target SNR is 6, and the up/down shift noise margins are 9/3

If the signal becomes better and the SNR is higher than 9, rate adaptation is triggered and the line rate becomes higher

If the signal becomes bad and the SNR is lower then 3, rate adaptation is triggered and the line rate becomes lower.

The following example creates a premium profile (named gold) for providing subscribers with very high connection speeds and no interleave delay. It uses the following settings.

- The maximum upstream rate is set to 2048 Kbps.
- The maximum downstream rate is set to 16000 Kbps.
- No interleave delay.

- The minimum upstream is set to 1024 Kbps.
- The minimum downstream is set to 3072 Kbps.
- The maximum, minimum and target acceptable ADSL upstream signal to noise margins are set to 12, 0 and 6 dB respectively.
- The maximum, minimum and target acceptable ADSL downstream signal to noise margins are also set to 12, 0 and 6 dB respectively.
- Upstream and downstream rate adaptation are both set to operate whenever the link is up.
- The upstream up/down shift noise margins are set to 9/3 dB.
- The downstream up/down shift noise margins are set to 9/3 dB.

```
ras> profile adsl set gold 2048 16000 fast minrate 1024 3072 usmgn 120 0 60
dsmgn 120 0 60 usra runtime 90 30 dsra runtime 90 30
```

This next example creates a similar premium profile (named goldi), except it sets an interleave delay of 16 ms for both upstream and downstream traffic.

```
ras> profile adsl set gold 2048 16000 delay 16 16 minrate 1024 3072 usmgn 120
0 60 dsmgn 120 0 60 usra runtime 90 30 dsra runtime 90 30
```

## 30.5.2 profile adsl map Command

Syntax:

`profile adsl map <profile>`

where

`<profile>` = The name of the profile.

This command displays which ADSL ports reference a specific profile.

The following example displays which ADSL ports use the gold profile.

```
ras> profile adsl map gold
```

## 30.5.3 profile adsl delete Command

Syntax:

`profile adsl delete <profile>`

where

`<profile>` = A profile name.

This command allows you to delete an individual ADSL profile by its name. You cannot delete a profile that is assigned to any of the ports in the system. Assign a different profile to any ports that are using the profile that you want to delete, and then you can delete the profile.

The following example deletes the gold ADSL profile.

```
ras> adsl profile delete gold
```

### 30.5.4 profile adsl show Command

Syntax:

`profile adsl show [<profile>]`

where

*<profile>* = A profile name.

This command displays the details of the specified ADSL profile or lists all of the ADSL profiles if you do not specify one.

The following example displays the ADSL profile named gold.

```
ras> profile adsl show gold
adsl profile: gold
                        upstream  downstream
                        --------  ----------
  max rate      (Kbps):     2048       16000
  min rate      (Kbps):     1024        3072
  latency delay   (ms):     fast        fast
  max margin      (dB):     12.0        12.0
  min margin      (dB):      0.0         0.0
  target margin   (dB):      6.0         6.0
  sra mode            :  runtime     runtime
  up shift mgn    (dB):      9.0         9.0
  down shift mgn  (dB):      3.0         3.0
```

## 30.6 profile alarmadsl Commands

Configure alarmadsl profiles to set alarm settings and thresholds for the ADSL ports.

### 30.6.1 profile alarmadsl show Command

Syntax:

`profile alarmadsl show [<profile>]`

where

*<profile>* = The name of an alarm profile.

This command displays the details of the specified alarm ADSL profile or lists all of the alarm ADSL profiles if you do not specify one.

The following example displays the default alarm ADSL profile (DEFVAL).

```
ras> profile alarmadsl show DEFVAL
adsl alarm profile : DEFVAL
                                      atuc       atur
                                  ---------- ----------
  15MinLofs(lofs)          (sec):         0          0
  15MinLoss(loss)          (sec):         0          0
  15MinLols(lols)          (sec):         0          -
  15MinLprs(lprs)          (sec):         0          0
  15MinESs(ess)            (sec):         0          0
  15MinFailedFastR(ffr)    (sec):         0          -
  15MinSesL(sesl)          (sec):         0          0
  15MinUasL(uasl)          (sec):         0          0
  FastRateUp(fru)         (kbps):         0          0
  InterleaveRateUp(iru)   (kbps):         0          0
  FastRateDown(frd)       (kbps):         0          0
  InterleaveRateDown(ird) (kbps):         0          0
  InitFailureTrap(ift)          :         -          -
ras>
```

## 30.6.2 profile alarmadsl set Command

Syntax:

`profile alarmadsl set <profile> atuc [lofs <lofs>] [loss <loss>] [lols <lols>][lprs <lprs>] [ess <ess>] [ffr <ffr>] [sesl <sesl>] [uasl <uasl>] [fru <fru>] [iru <iru>] [frd <frd>] [ird <ird>] [ift <ift>]`

`or <profile> atur [lofs <lofs>] [loss <loss>] [lprs <lprs>][ess <ess>] [sesl <sesl>] [uasl <uasl>] [fru <fru>][iru <iru>][frd <frd>] [ird <ird>]`

where

| | | |
|---|---|---|
| `<profile>` | = | A name for the alarm profile (up to 31 English keyboard characters). |
| `atuc` | = | Downstream. These parameters are for the connection (or traffic) going from the IES-5000 to the subscriber's device. |
| `atur` | = | Upstream. These parameters are for the connection (or traffic) coming from the subscriber's device to the IES-5000. |
| `<lofs>` | = | The number of Loss Of Frame Seconds (0~900) that are permitted to occur within 15 minutes. |
| `<loss>` | = | The number of Loss Of Signal Seconds (0~900) that are permitted to occur within 15 minutes. |
| `<lols>` | = | The number of Loss Of Link Seconds (0~900) that are permitted to occur within 15 minutes. |
| `<lprs>` | = | The Number of Loss of PoweR seconds (0~900) permitted to occur (on the ATUR) within 15 minutes. |
| `<ess>` | = | The number of Errored SecondS (0~900) that are permitted to occur within 15 minutes. |
| `<ffr>` | = | The number of Failed Fast Retrain seconds (0~900) that are permitted to occur within 15 minutes. |
| `<sesl>` | = | The number of Severely Errored Seconds (0~900) that are permitted to occur within 15 minutes. |

| | | |
|---|---|---|
| *<uasl>* | = | The number of UnAvailable Seconds (0~900) that are permitted to occur within 15 minutes. |
| *<fru>* | = | A rate in kilobits per second (Kbps). If a fast mode connection's upstream transmission rate increases by more than this number, then a trap is sent. |
| *<iru>* | = | A rate in kilobits per second (Kbps). If an interleave mode connection's upstream transmission rate increases by more than this number, then a trap is sent. |
| *<frd>* | = | A rate in kilobits per second (Kbps). If a fast mode connection's downstream transmission rate decreases by more than this number, then a trap is sent. |
| *<ird>* | = | A rate in kilobits per second (Kbps). If an interleave mode connection's downstream transmission rate decreases by more than this number, then a trap is sent. |
| *<ift>* | = | "1" sets the profile to trigger an alarm for an initialization failure trap. "0" sets the profile to not trigger an alarm for an initialization failure trap. |

The `alarmprofile set` command configures ADSL port alarm thresholds. The system sends an alarm trap and generates a syslog entry when the thresholds of the alarm profile are exceeded.

Configure `alarmadsl` profiles first and then use the `port adsl alarmprof` command to use them with specific ADSL ports.

The following example sets an alarm profile named SESalarm that has the system send an alarm trap and generate a syslog whenever the atuc connection (from the IES-5000 to the subscriber) has more than 3 severely errored seconds within a 15 minute period.

```
ras> profile alarmadsl set SESalarm atuc ses 3
```

## 30.6.3 profile alarmadsl delete Command

Syntax:

`profile alarmadsl delete <profile>`

where

| | | |
|---|---|---|
| *<profile>* | = | The name of an alarm profile. |

This command allows you to delete an individual ADSL alarm profile by its name. You cannot delete the DEFVAL alarm profile.

The following example deletes the SESalarm alarm profile.

```
ras> profile alarmadsl delete SESalarm
```

## 30.6.4 profile alarmadsl map Command

Syntax:

`profile alarmadsl map <profile>`

where

*<profile>* = The name of an alarm profile.

This command displays which ADSL ports are set to use the specified alarmadsl profile.

The following example displays which ADSL ports use the SESalarm alarmadsl profile.

```
ras> profile alarmadsl map SESalarm
```

# 30.7 profile alarmshdsl Commands

Configure alarmshdsl profiles to set alarm settings and thresholds for the SHDSL ports.

## 30.7.1 profile alarmshdsl show Command

Syntax:

`profile alarmshdsl show [<profile>]`

where

*<profile>* = A profile name.

This command displays the details of the specified alarm SHDSL profile or lists all of the alarm SHDSL profiles if you do not specify one.

The following example displays the default alarm SHDSL profile (DEFVAL).

```
ras> profile alarmshdsl show DEFVAL
shdsl alarm profile : DEFVAL
  loop attenuation(atten)  (dB):         0
  snr margin(snrmgn)       (dB):         0
  es                      (sec):         0
  ses                     (sec):         0
  crc anomalies(crc)            :        0
  losws                   (sec):         0
  uas                     (sec):         0
ras>
```

## 30.7.2 profile alarmshdsl set Command

Syntax:

`<profile> [atten <atten>] [snrmgn <snrmgn>] [es <es>] [ses <ses>][crc <crc>] [losws <losws>] [uas <uas>]`

where

*<profile>* = A name for the alarm profile (up to 31 English keyboard characters).

*<atten>* = The permitted loop attenuation of a port, 0~127

| | | |
|---|---|---|
| *<snrmgn>* | = | The permitted signal to noise ratio margin, 0~15. |
| *<ess>* | = | The number of Errored SecondS (0~900) that are permitted to occur within 15 minutes. |
| *<ses>* | = | The number of Severely Errored Seconds (0~900) that are permitted to occur within 15 minutes. |
| *<crc>* | | The number of Cyclic Redundancy Checking anomalies that are permitted to occur within 15 minutes. |
| *<losws>* | | The number of Loss Of Sync Word Seconds (0~900) that are permitted to occur within 15 minutes. |
| *<uas>* | = | The number of UnAvailable Seconds (0~900) that are permitted to occur within 15 minutes. |

This command configures SHDSL port alarm thresholds. The system sends an alarm trap and generates a syslog entry when the thresholds of the alarm profile are exceeded.

Configure `alarmshdsl` profiles first and then use the `port shdsl alarmprof` command to to use them with specific SHDSL ports.

The following example sets an alarm profile named SESalarm that has the system send an alarm trap and generate a syslog whenever the connection's number of severely errored seconds exceeds three within a 15 minute period.

```
ras> profile alarmshdsl set SESalarm ses 3
```

## 30.7.3 profile alarmshdsl delete Command

Syntax:

`profile alarmshdsl delete <profile>`

where

| | | |
|---|---|---|
| *<profile>* | = | The name of an alarm profile. |

This command allows you to delete an individual SHDSL alarm profile by its name. You cannot delete the DEFVAL alarm profile.

The following example deletes the SESalarm alarm profile.

```
ras> profile alarmshdsl delete SESalarm
```

## 30.7.4 profile alarmshdsl map Command

Syntax:

`profile alarmshdsl map <profile>`

where

| | | |
|---|---|---|
| *<profile>* | = | The name of an alarm profile. |

This command displays which SHDSL ports are set to use the specified alarmshdsl profile.

The following example displays which SHDSL ports use the SESalarm alarmshdsl profile.

```
ras> profile alarmshdsl map SESalarm
```

# 30.8 profile alarmvdsl Commands

Configure alarmvdsl profiles to set alarm settings and thresholds for the VDSL ports.

## 30.8.1 profile alarmvdsl show Command

Syntax:

`profile alarmvdsl show [<profile>]`

where

`<profile>` = The name of an alarm profile.

This command displays the details of the specified alarm VDSL profile or lists all of the alarm VDSL profiles if you do not specify one.

The following example displays the default alarm VDSL profile (DEFVAL).

```
ras> profile alarmvdsl show DEFVAL
vdsl alarm profile : DEFVAL
  initFailure(ift)              :         -
  15MinLofs(lofs)          (sec):         0
  15MinLoss(loss)          (sec):         0
  15MinLols(lols)          (sec):         0
  15MinLprs(lprs)          (sec):         0
  15MinESs(ess)            (sec):         0
  15MinSesL(sesl)          (sec):         0
  15MinUasL(uasl)          (sec):         0
ras>
```

## 30.8.2 profile alarmvdsl set Command

Syntax:

`profile alarmvdsl set <profile> [lofs <lofs>] [loss <loss>] [lols <lols>] [lprs <lprs>] [ess <ess>] [sesl <sesl>] [uasl <uasl>] [ift <ift>]`

where

`<profile>` = A name for the alarm profile (up to 31 English keyboard characters).

`<lofs>` = The number of Loss Of Frame Seconds (0~900) that are permitted to occur within 15 minutes.

`<loss>` = The number of Loss Of Signal Seconds (0~900) that are permitted to occur within 15 minutes.

`<lols>` = The number of Loss Of Link Seconds (0~900) that are permitted to occur within 15 minutes.

| | | |
|---|---|---|
| *<lprs>* | = | The Number of Loss of PoweR seconds (0~900) permitted to occur (on the ATUR) within 15 minutes. |
| *<ess>* | = | The number of Errored SecondS (0~900) that are permitted to occur within 15 minutes. |
| *<sesl>* | = | The number of Severely Errored Seconds (0~900) that are permitted to occur within 15 minutes. |
| *<uasl>* | = | The number of UnAvailable Seconds (0~900) that are permitted to occur within 15 minutes. |
| *<iru>* | = | A rate in kilobits per second (Kbps). If an interleave mode connection's upstream transmission rate increases by more than this number, then a trap is sent. |
| *<ift>* | = | "1" sets the profile to trigger an alarm for an initialization failure trap. "0" sets the profile to not trigger an alarm for an initialization failure trap. |

The `alarmprofile set` command configures VDSL port alarm thresholds. The system sends an alarm trap and generates a syslog entry when the thresholds of the alarm profile are exceeded.

Configure `alarmvdsl` profiles first and then use the `port vdsl alarmprof` command to use them with specific VDSL ports.

The following example sets an alarm profile named SESalarm that has the system send an alarm trap and generate a syslog whenever the connection (from the IES to the subscriber) has more than 3 severely errored seconds within a 15-minute period.

```
ras> profile alarmvdsl set SESalarm sesl 3
```

## 30.8.3 profile alarmvdsl delete Command

Syntax:

`profile alarmvdsl delete <profile>`

where

| | | |
|---|---|---|
| *<profile>* | = | The name of an alarm profile. |

This command allows you to delete an individual VDSL alarm profile by its name. You cannot delete the DEFVAL alarm profile.

The following example deletes the SESalarm alarm profile.

```
ras> profile alarmvdsl delete SESalarm
```

## 30.8.4 profile alarmvdsl map Command

Syntax:

`profile alarmvdsl map <profile>`

where

*<profile>* = The name of an alarm profile.

This command displays which VDSL ports are set to use the specified alarm profile.

The following example displays which VDSL ports use the SESalarm alarm profile.

```
ras> profile alarmvdsl map SESalarm
   side                        port
-- ---- ------------------------------------------------------------------
           1         2         3         4         5         6         7
       12345678901234567890123456789012345678901234567890123456789012345678
 2    - ------------------------
 3    - ------------------------
 4    - ------------------------------------------------
 5    - ------------------------------------------------
```

# 30.9 profile atm Commands

Use these commands to configure ATM traffic settings.

## 30.9.1 profile atm show Command

Syntax:

`profile atm show [<profile>]`

where

*profile* A profile name.

This command displays the details of the specified ATM profile or lists all of the ATM profiles if you do not specify one.

The following example displays the DEFVAL ATM profile.

```
ras> profile atm show DEFVAL
atm profile: DEFVAL
  traffic class: ubr
  pcr          : 300000
  cdvt         : 0
ras>
```

## 30.9.2 profile atm set Command

Syntax:

`profile atm set <atmprofile> cbr|ubr <pcr> <cdvt>`

or
`profile atm set <atmprofile> rt-vbr|nrt-vbr <pcr> <cdvt> <scr> <bt>`

where

| | |
|---|---|
| <*atmprofile*> | The name of the ATM profile (up to 31 English keyboard characters). You cannot change the **DEFVAL** profile. |
| <ubr\|cbr> | The ubr (unspecified bit rate) or cbr (constant bit rate) ATM traffic class. |
| <*pcr*> | Peak Cell Rate (150~300000), the maximum rate (cells per second) at which the sender can send cells. * sets the default value. |
| [*cdvt*] | Cell Delay Variation Tolerance is the accepted tolerance of the difference between a cell's transfer delay and the expected transfer delay (number of cells). 0 to 255 cells or * for the default value. |
| rt-vbr\|nrt-vbr | The Real-Time Variable Bit Rate (vbr) or Non Real-Time Variable Bit Rate (nrt-vbr) Variable Bit Rate ATM traffic class. |
| <*scr*> | The Sustainable Cell Rate (150~300000) sets the average cell rate (long-term) that can be transmitted (cells per second). SCR applies with the vbr traffic class. * sets the default value. |
| <*bt*> | Burst Tolerance this is the maximum number of cells (0~255) that the port is guaranteed to handle without any discards. BT applies with the vbr traffic class. * sets the default value. |

This command creates a profile of ATM traffic settings.

After you create an ATM profile, you can use it with the `port ppvc set` or `port pvc set` command to assign it to a virtual circuit.

The following example creates an ATM profile named gold. It uses constant bit rate and has the maximum rate (peak cell rate) set to 300,000 cells per second. The acceptable tolerance of the difference between a cell's transfer delay and the expected transfer delay (CDVT) is set to 5 cells.

```
ras> profile atm set gold cbr 300000 5
```

The following example creates an ATM profile named silver. It uses real-time variable bit rate and has the maximum rate (peak cell rate) set to 250,000 cells per second. The acceptable tolerance of the difference between a cell's transfer delay and the expected transfer delay (CDVT) is set to 5 cells. The average cell rate that can be transmitted (SCR) is set to 100,000 cells per second. The maximum number of cells that the port is guaranteed to handle without any discards (BT) is set to 200.

```
ras> profile atm set silver rt-vbr 250000 5 100000 200
```

The following example creates an ATM profile named economy. It uses unspecified bit rate and has the maximum rate (peak cell rate) set to 10,000 cells per second. The acceptable tolerance of the difference between a cell's transfer delay and the expected transfer delay (CDVT) is set to 100 cells.

```
ras> profile atm set economy ubr 10000 100
```

### 30.9.3 profile atm delete Command

Syntax:

`profile atm delete <profile>`

where

`<profile>` = The name of a profile.

This command allows you to delete an individual ATM profile by its name. You cannot delete the DEFVAL profile.

You cannot delete an ATM profile that is assigned to any of the PVCs or PPVCs. Assign a different profile to any PVCs or PPVCs that are using the profile that you want to delete, and then you can delete the profile.

The following example deletes the silver ATM profile.

```
ras> profile atm delete silver
```

### 30.9.4 profile atm map Command

Syntax:

`profile atm map <profile>`

where

`<profile>` = The name of a profile.

This command displays which PVCs or PPVCs are set to use the specified ATM profile.

The following example displays which PVCs or PPVCs use the silver profile.

```
ras> profile atm map silver
```

## 30.10 Profile Server

The profile server feature manages profiles on multiple IES's. You can configure profiles on one IES that you set to server mode. When you want to configure another IES, you can set it to client mode to get the profile settings from (synchronize with) the IES in server mode. If you change the profile settings on the IES in server mode, you can have it synchronize the profile settings on the clients to match.

## 30.11 profile ipqos Commands

Use these commands to configure the profile server feature settings.

## 30.11.1 profile ipqos set Command

Syntax:

`profile ipqos set <profile> <number_of_queues>`

This command adds an IPQoS profile named EXAMPLE with 8 queues.

```
ras> profile ipqos set EXAMPLE 8
```

## 30.11.2 profile ipqos show Command

Syntax:

`profile ipqos show [profile]`

This command displays the EXAMPLE IPQoS profile settings.

```
ras> profile ipqos show EXAMPLE
ipqos profile : EXAMPLE
queue number  : 8
idx  pir    cir    pbs    cbs
--- ------ ------ ------ ------
  0  32768  16384  65536  65536
  1  32768  16384  65536  65536
  2  32768  16384  65536  65536
  3  32768  16384  65536  65536
  4  32768  16384  65536  65536
  5  32768  16384  65536  65536
  6  32768  16384  65536  65536
  7  32768  16384  65536  65536
```

## 30.11.3 profile ipqos queue Command

Syntax:

`profile ipqos queue <profile> <queue_id> <pir> <cir> <pbs> <cbs>`

where

| | | |
|---|---|---|
| *profile* | = | An IPQoS profile name. |
| *queue_id* | = | 0~the number of queues-1. For example, if a profile has 8 queues, then you can set this 0~7. |
| *pir* | = | Peak Information Rate (PIR) is the maximum data rate allowed for the downstream traffic flowing through the system.<br>Enter a number which is a multiple of 64 in the range of 128~32768 kbps. |
| *cir* | = | Committed Information Rate (CIR) is the guaranteed data rate for the downstream traffic flowing through the system.<br>Enter a number which is a multiple of 64 in the range of 64~16384 kbps.<br><br>Note: *cir* < *pir* <= 2 x *cir*. For example, the *cir* is 1024, you should enter the *pir* equal or less than 2048 (=2 x 1024). |
| *pbs* | = | Peak Burst Size (PBS) is the maximum burst size allowed for the downstream traffic flowing through the system when the burst data rate is between the predefined PIR and CIR.<br>Enter a number which is a multiple of 256 in the range of 3072~65536 bytes. |
| *cbs* | = | Committed Burst Size (CBS) is the committed burst size allowed for the downstream traffic flowing through the system when the burst data rate is smaller than the predefined PIR.<br>Enter a number which is a multiple of 256 in the range of 3072~65536 bytes.<br><br>Note: *cbs* <= *pbs* |

This command displays the EXAMPLE IPQoS profile settings.

```
ras> profile ipqos queue EXAMPLE 1 1088 1024 3072 3072
ipqos profile : EXAMPLE
queue number  : 8
idx  pir    cir    pbs    cbs
--- ------ ------ ------ ------
  0  32768  16384  65536  65536
  1   1088   1024   3072   3072
  2  32768  16384  65536  65536
  3  32768  16384  65536  65536
  4  32768  16384  65536  65536
  5  32768  16384  65536  65536
  6  32768  16384  65536  65536
  7  32768  16384  65536  65536
```

## 30.11.4 profile ipqos map Command

Syntax:

`profile ipqos map <profile>`

This command displays the associated ports using the specified IPQoS profile.

```
ras> profile ipqos map EXAMPLE
slot                      port
---- ------------------------------------------------------------------------
              1         2         3         4         5         6         7
     12345678901234567890123456789012345678901234567890123456789012345678901
   2 ------------------------
   3 ------------------------
   4 ------------------------------------------------
   5 ------------------------------------------------
```

### 30.11.5 profile ipqos delete Command

Syntax:

`profile ipqos delete [`*`profile`*`]`

This command deletes the EXAMPLE IPQoS profile.

```
ras> profile ipqos delete EXAMPLE
```

## 30.12 profile profsvr Commands

Use these commands to configure the profile server feature settings.

### 30.12.1 profile profsvr show Command

Syntax:

`profile profsvr show`

This command displays the current profile server setting.

```
ras> profile profsvr show
mode     :server mode
no       Client Ip      type
----  ---------------  ------
01          1.2.3.4      0
```

### 30.12.2 profile profsvr mode Command

Syntax:

`profile profsvr mode client|server`

This command sets the profile server operation mode.

```
ras> profile profsvr mode server
```

## 30.12.3 profile profsvr clientlist set Command

Syntax:

`profile profsvr clientlist set <ip-address> <type>`

where

| | | |
|---|---|---|
| <*type*> | = | A profile client IES may have unused profiles on it (profiles that are not mapped to any ports).<br>Use `0` to leave these unused profiles on the client IES when synchronizing the profiles.<br>Use `1` to delete these unused profiles from the client IES when synchronizing the profiles. |

This command adds an entry to the profile server client list. When the IES is in server mode, use this command to add entries to the list of client IES's.

The following example sets a profile server client entry for an IES at IP address 1.2.3.4. If there are any unused profiles on this client during the synchronization process, they will be left on the client.

```
ras> profile profsvr clientlist set 1.2.3.4 0
```

## 30.12.4 profile profsvr clientlist delete Command

Syntax:

`profile profsvr clientlist delete <ip-address>`

This command removes an entry from the profile server client list.

The following example removes a profile server client entry for an IES at IP address 1.2.3.4.

```
ras> profile profsvr clientlist delete 1.2.3.4
```

## 30.12.5 profile profsvr clientlist show Command

Syntax:

`profile profsvr clientlist show <ip-address>`

This command displays the profile server client list.

```
ras> profile profsvr clientlist show
no       Client Ip      type
----  ---------------  ------
01          1.2.3.4      0
02          1.2.3.5      0
```

## 30.12.6 profile profsvr serverset Command

Syntax:

`profile profsvr serverset <ip-address>`

This command sets the target profile server IP address for synchronization. When the IES is in client mode, use this command to specify the IP address of the IES in server mode.

The following example sets an IP address of 5.6.7.8 to use in synchronizing profile settings.

```
ras> profile profsvr serverset 5.6.7.8
```

### 30.12.7 profile profsvr sync Command

Syntax:

```
profile profsvr sync
```

This command has the IES synchronize it's profile settings. If the IES is in client mode, it will attempt to get profile settings from the IES in server mode. If the IES is in server mode, it will send its profile settings to the IES's in the profile server client list.

## 30.13 profile shdsl Commands

Use the `profile shdsl` commands to configure SHDSL profiles.

### 30.13.1 profile shdsl set Command

Syntax:

```
profile shdsl set <profile> <min-rate> <max-rate>
 [annexa|annexb 2wire|4wire|mpair4
 [lp_off | lp_on_cur [curr_margin] | lp_on_wc [worst_margin]]]
```

where

| | | |
|---|---|---|
| *<profile>* | = | The descriptive name for the profile. |
| *<min-rate>* | = | The minimum transmission rate in Kbps (192~4096). |
| *<max-rate>* | = | The maximum transmission rate in Kbps. (192~4096) |
| annexa\|annexb | = | The region setting, annexb is the default.<br>annexa: DSL over POTS.<br>annexb: DSL over ISDN. |
| 2wire\|4wire\|mpair4 | = | The wire pair number.<br>2wire: A normal connection using a single SHDSL port's two wires, this is the default.<br>4wire: A 4-wire n-wire group (two SHDSL ports grouped together).<br>mpair4: An 8-wire n-wire group (four SHDSL ports grouped together). |
| lp_off | = | Disable line probe.<br>The SHDSL line card and subscriber modem use line probes to determine the best possible transmission rate. This is used in rate adaptation. This is the default line probe mode.<br>If you disable line probe, the system skips the rate adaptation phase to shorten connection set up time. |
| lp_on_cur | = | Enable line probe with current target Signal to Noise Ratio margin. |

| | | |
|---|---|---|
| `lp_on_wc` | = | Enable line probe with worst case target Signal to Noise Ratio margin. |
| <*curr-margin*> | = | The current condition target Signal to Noise Ratio margin, -10 ~ 21 in dB. You only configure this if you enable line probing using the current target Signal to Noise Ratio margin. |
| <*worst-margin*> | = | The worst case Signal to Noise Ratio margin, -10 ~ 21 in dB. You only configure this if you enable line probing using the worst case target Signal to Noise Ratio margin. |

The profile is a table that contains information on SHDSL line configuration. Each entry in this table reflects a parameter defined by a manager, which can be used to configure the shdsl line. After you create an SHDSL profile, assign it to SHDSL ports on an SHDSL line card.

You must specify at least the profile's name and minimum and maximum rates. The default value will be used for any of the other fields that you omit.

The minimum transmission rate must be less than or equal to the maximum transmission rate.

When using 4 or 8-wire groups, you must apply the profile to consecutive ports. A profile for a 4-wire group can be used with ports 1,2 or 3,4 or 5,6 and so forth (the first two ports, the second two ports, the third two ports and so on). You cannot use a 4-wire group with ports 2,3 or 4,5. A profile for an 8-wire group can be used with ports 1,2,3,4 or 5,6,7,8 or 9,10,11,12 and so forth (the first four ports, the second four ports, the third four ports and so on). You cannot use an 8-wire group with ports 2,3,4,5 or 4,5,6,7.

The following example creates a premium profile (named gold) for providing subscribers with very high connection speeds. The minimum transmission rate is 2112 Kbps and the maximum transmission rate is 4096. It sets two ports to function as a 4-wire group. It uses Annex A (DSL over POTS). It turns on line probes and has them use the current condition target signal to noise ratio margin which it sets to 5 db.

```
ras> profile shdsl set gold 2112 4096 annexa 4wire lp_on_cur 5
```

## 30.13.2 profile shdsl map Command

Syntax:

`profile shdsl map <profile>`

where

| | | |
|---|---|---|
| <*profile*> | = | The name of the profile. |

This command displays which SHDSL ports reference a specific profile.

The following example displays which SHDSL ports use the gold profile.

```
ras> profile shdsl map gold
```

## 30.13.3 profile shdsl delete Command

Syntax:

`profile shdsl delete <profile>`

where

*<profile>* = A profile name.

This command allows you to delete an individual shdsl profile by its name. You cannot delete a profile that is assigned to any of the DSL ports in the system. Assign a different profile to any DSL ports that are using the profile that you want to delete, and then you can delete the profile.

The following example deletes the gold SHDSL profile.

```
ras> profile shdsl delete gold
```

### 30.13.4 profile shdsl show Command

Syntax:

`profile shdsl show [<profile>]`

where

*<profile>* = A profile name.

This command displays the details of the specified SHDSL profile or lists all of the SHDSL profiles if you do not specify one.

The following example displays the SHDSL profile named gold.

```
ras> profile shdsl show gold
shdsl profile: gold
  max rate      (Kbps): 4096
  min rate      (Kbps): 2112
  annex mode          : annexa
  wire pair           : 4wire
  line probe          : enable with current target SNR margin
  curr margin     (dB): 5
ras>
```

## 30.14 profile vdsl commands

Use the `profile shdsl` commands to configure VDSL profiles.

### 30.14.1 profile vdsl delete command

Syntax:

`profile vdsl delete <profile>`

where

*<profile>* = A profile name.

This command allows you to delete an individual shdsl profile by its name. You cannot delete a profile that is assigned to any of the DSL ports in the system. Assign a different profile to any DSL ports that are using the profile that you want to delete, and then you can delete the profile.

The following example deletes the `standard` VDSL profile.

```
ras> profile vdsl delete standard
```

## 30.14.2 profile vdsl map command

Syntax:

`profile vdsl map <profile>`

This command displays which VDSL ports reference a specific profile.

The following example displays which VDSL ports use the `standard` profile.

```
ras> profile shdsl map standard
```

## 30.14.3 profile vdsl set command

Syntax:

`profile vdsl set <profile> <us-max-rate> <ds-max-rate> [fast|delay <us-delay> <ds-delay>] [minrate <us-min-rate> <ds-min-rate>] [usmgn <us-max-mgn> <us-min-mgn> <us-tgt-mgn>] [dsmgn <ds-max-mgn> <ds-min-mgn> <ds-tgt-mgn>]`

where

| | | |
|---|---|---|
| `<profile>` | = | The descriptive name for the profile. Up to 31 characters. |
| `<us-max-rate>` | = | The maximum VDSL upstream transmission rate, 64~45440 in Kbps. The upstream rate must be less than or equal to the downstream rate. |
| `<ds-max-rate>` | = | The maximum VDSL downstream transmission rate, 64~100032 in Kbps. |
| `[fast\|delay <us-delay> <ds-delay>]` | = | The latency mode. With interleave, you must also define the upstream and downstream delay (1-255 ms). It is recommended that you configure the same delay for both upstream and downstream. |
| `[minrate <us-min-rate> <ds-min-rate>]` | = | The minimum VDSL upstream transmission rate (32~45440 Kbps) and the minimum ADSL downstream transmission rate (32~100032 Kbps). |
| `[usmgn <us-max-mgn> <us-min-mgn> <us-tgt-mgn>]` | = | The maximum, minimum and target acceptable VDSL upstream signal to noise margins (0~310 in 0.1 dB measurements). |

The profile is a list of VDSL line configuration settings. After you create a VDSL profile, you can assign it to any of the VDSL ports on any of the VDSL line cards.

The system rounds the signal to noise margin settings to the nearest multiple of 0.25 dB.

The following example creates a VDSL profile (named `standard`) for providing subscribers with very high connection speeds and no interleave delay. It uses the following settings.

- The maximum upstream rate is set to 2048 Kbps.
- The maximum downstream rate is set to 16000 Kbps.
- No interleave delay.
- The minimum upstream is set to 1024 Kbps.
- The minimum downstream is set to 3072 Kbps.
- The maximum, minimum and target acceptable VDSL upstream signal to noise margins are set to 12, 0 and 6 dB respectively.
- The maximum, minimum and target acceptable VDSL downstream signal to noise margins are also set to 12, 0 and 6 dB respectively.

```
ras> profile vdsl set standard 2048 16000 fast minrate 1024 3072 usmgn 12 0
6 dsmgn 12 0 6
```

This next example creates a similar VDSL profile (named `standardB`), except it sets an interleave delay of 16 ms for both upstream and downstream traffic.

```
ras> profile vdsl set standardB 2048 16000 delay 16 16 minrate 1024 3072 us
mgn 12 0 6 dsmgn 12 0 6
```

## 30.14.4 profile vdsl show Command

Syntax:

`profile vdsl show [<`*`profile`*`>]`

where

*<profile>* = The descriptive name for the profile.

This command displays the VDSL profile list of the settings of a VDSL profile configured on the system.

The following example displays the profile list and the settings of the `standard` profile.

```
ras> profile vdsl show
vdsl profile(s):
----------------------
1. DEFVAL
2. standard
3. standardB

ras> profile vdsl show standard
vdsl profile: standard
                         upstream  downstream
                         --------  ----------
  max rate      (Kbps):     2048       16000
  min rate      (Kbps):     1024        3072
  latency delay   (ms):     fast        fast
  max margin      (dB):      1.2         1.2
  min margin      (dB):      0.0         0.0
  target margin   (dB):      0.6         0.6
ras>
```

# 30.15 profile voip dsp Commands

Use these commands to set up and manage Digital Signal Processing for the VoIP line cards. Each DSP profile specifies VoIP-related attributes, such as the voice codecs to use in a given session.

## 30.15.1 profile voip dsp delete Command

Syntax:

`profile voip dsp delete <`*`name`*`>`

This command removes the specified DSP profile. An example is shown to delete a DSP profile named “digsig1”.

```
ras> profile voip dsp delete digsig1
```

## 30.15.2 profile voip dsp map Command

Syntax:

`profile voip dsp map <`*`name`*`>`

This command displays which subscribers use the specified DSP profile. An example is shown, displaying the subscribers that use a DSP profile named “digsig3”.

```
ras> profile voip dsp map digsig3
slot                      port
---- ----------------------------------------------
              1         2         3         4
     12345678901234567890123456789012345678901234567890
   3
   4 V-V-V-V-V-V-V-V-V-V-V-V-V-V-V-V-V-V-V-V-----------
   5
   6
   7
   8 ------------------------
   9
  10
```

## 30.15.3 profile voip dsp set Command

Syntax:

```
profile voip dsp set <name>
 [codec <codec> [,<codec>...]
 [playbuffer <min-delay> <max-delay>]
 [echotail <echotail>]
 [echocancel off|on]
 [vad off|on]
 [g711vpi <g711-vpi>]
 [g723vpi <g723-vpi>]
 [g726vpi <g726-vpi>]
 [g729vpi <g729-vpi>]
```

where

| | | |
|---|---|---|
| *<codec>* | = | Available codecs are:<br>G.711a: `g711a`<br>G.711µ: `g711mu`<br>G.723: `g723`<br>G.726<br>16-bit: `g726-16`<br>24-bit: `g726-24`<br>32-bit: `g726-32`<br>40-bit: `g726-40`<br>G.729a & b: `g729ab` |
| *<min-delay>* | = | The play buffer minimum delay in milliseconds (10 ~ 500). This value should be less than or equal to the `<max-delay>`. |
| *<max-delay>* | = | The play buffer maximum delay in milliseconds (10 ~ 500). This value should be greater than or equal to the `<min-delay>`. |
| *<echo-tail>* | = | The echo cancellation echo tail period in milliseconds (8, 16, 32 or 128). |
| `echocancel` | = | Enable or disable echo cancellation. |
| `vad` | = | Enable or disable Voice Activity Detection (VAD). |
| *g711-vpi* | = | Set the G.711 voice package interval, 10, 20, 30 or 40 ms. |

| | | |
|---|---|---|
| *g723-vpi* | = | Set the G.723 voice package interval, 30 or 60 ms. |
| *g726-vpi* | = | Set the G.726 voice package interval, 10, 20, 30 or 40 ms. |
| *g729-vpi* | = | Set the G.729 voice package interval, 10, 20, 30, 40, 50 or 60 ms. |

This command creates and configures a DSP (Digital Signal Processing) profile. The default profile “DEFVAL” has the following settings:

- Codec: G.711a, G.711µ
- Min-delay: 30 ms
- Max-delay: 120 ms
- Echo tail: 32ms
- Echo cancellation: on
- VAD: off
- G.711 voice package interval: 20
- G.723 voice package interval: 30
- G.726 voice package interval: 20
- G.729 voice package interval: 20

The following example shows a command configuring a DSP profile named “digsig4” with the following settings:

- Codec: G.726 (40 bits), G.726 (32 bits), G.726 (16 bits).
- Min-delay: 30 ms
- Max-delay: 90 ms
- Echo tail: 32 ms

```
ras> profile voip dsp set digsig4 codec g726-40,g726-32,g726-16 playbuffer
30 90 echotail 32
```

## 30.15.4 profile voip dsp show Command

Syntax:

`profile voip dsp show [<name>]`

This command displays the settings of the specified DSP profile, or displays the names of all DSP profiles if none is specified. An example is shown next.

```
ras> profile voip dsp show
dsp profile(s)
------------------------
1. DEFVAL
2. digsig4

ras> profile voip dsp show digsig4
dsp profile        : digsig4
codec              : g726-40 g726-32 g726-16
playbuff min-delay : 30
playbuff max-delay : 90
echotail           : 32
echocancel         : on
vad                : off
g711vpi            : 20
g723vpi            : 30
g726vpi            : 20
g729vpi            : 20
```

# 30.16 profile voip h248 Commands

Use these commands to set up and manage h248 profiles. h248 profiles map to ports on the VoIP line cards, and contain the media gateway details.

## 30.16.1 profile voip h248 delete Command

Syntax:

`profile voip h248 delete <`*`profile`*`>`

This command removes the specified H248 profile. An example is shown to delete the h248 profile named “h248_profile”.

```
ras> profile voip h248 delete h248_profile
```

## 30.16.2 profile voip h248 map Command

Syntax:

`profile voip h248 map [`*`profile`*`]`

This command displays the specified h248 profile. An example is shown to display the h248 profile named “h248_profile”.

```
ras> profile voip h248 h248_profile
```

### 30.16.3 profile voip h248 set Command

Syntax:

```
profile voip set h248 <profile> <mgc-ip>|<mgc-dn>[mgcport <mgc-port>][mgc2
off|{on <mgc2-ip>|<mgc2-dn>}][mgc2port <mgc2-port>][transport udp|tcp][encode
long|short][pbit <pbit>][dscp <dscp>]

where
```

| | | |
|---|---|---|
| *<mgc-ip>* *<mgc2-ip>* | = | The primary and secondary MGC server IP address. |
| *<mgc-dn>* *<mgc2-dn>* | = | The primary and secondary MGC server domain name (maximum 256 characters), for example host.netdomain. |
| *<mgc-port>* *<mgc2-port>* | = | The primary and secondary MGC server port. |
| `transport udp\|tcp` | = | Select whether to use UDP or TCP as the transport protocol. |
| `encode long\|short` | = | Select whether to use the long or short h248 coding type format. |
| `pbit` | = | The 802.1p priority bit for H.248 and RTP packets (0 ~ 7). |
| `dscp` | = | The DSCP bit for H.248 and RTP packet (0 ~ 63). |

This command sets up an h248 profile. An example is shown to set up an h248 profile (h248_profile), an MGC IP address (123.3.3.3), MGC port (1025), no secondary MGC, protocol (udp), long encoding, a pbit of 1 and a DHCP bit of 1.

```
ras> profile voip h248 set h248_profile 123.3.3.3 mgcport 1025 mgc2 off
transport udp encode long pbit 1 dscp 1
```

### 30.16.4 profile voip h248 show Command

Syntax:

```
profile voip h248 show <profile>
```

This command displays the specified h248 profile. An example is shown to displays all h248 profiles.

```
ras> profile voip h248 show
H.248 profile(s):
----------------------
1. DEFVAL
2. h248_profile
```

## 30.17 profile voip sip Commands

Use these commands to set up and manage SIP profiles. SIP profiles map to ports on the VoIP line cards, and contain the SIP server connection details.

## 30.17.1 profile voip sip delete Command

Syntax:

`profile voip sip delete <name>`

This command removes the specified SIP profile. An example is shown to delete the SIP profile named “bar”.

```
ras> profile voip sip delete bar
```

## 30.17.2 profile voip sip map Command

Syntax:

`profile voip sip map <name>`

This command displays which subscribers use the specified SIP profile. An example is shown, displaying the ports that map to a SIP profile named “SIP12” (ports 1 to 48 on slot 4).

```
ras> profile voip sip map SIP12
slot                        port
---- ----------------------------------------------
              1         2         3         4
     12345678901234567890123456789012345678901234567890
   3
   4 VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
   5
   6
   7
   8 ------------------------
   9
  10
```

## 30.17.3 profile voip sip set Command

Syntax:

`profile voip sip set <name> <sip-ip>|<sip-dn> <regsvr-ip>|<regsvr-dn> [sipport <sip-port>] [regsvrport <regsvr-port>] [proxysvrport <proxysvr-port>] [uritype sip|tel] [pbit <pbit>] [dscp <dscp>] [keepalive off|on <se>] [prack on|off]`

where

| | | |
|---|---|---|
| *<sip-ip>* | = | The SIP server IP address. |
| *<sip-dn>* | = | The SIP server domain name (maximum 256 characters). |
| *<regsvr-ip>* | = | The SIP registrar server IP address. |
| *<regsvr-dn>* | = | The SIP registrar server domain name (maximum 256 characters). |
| *<proxysvr-ip>* | = | The SIP proxy server IP address. |
| *<proxysvr-dn>* | = | The SIP proxy server domain name (maximum 256 characters). |
| *<sip-port>* | = | The SIP server port number (1025 ~ 65535). |

| | | |
|---|---|---|
| *<regsvr-port>* | = | The registrar server port number (1025 ~ 65535). |
| *<proxysvr-port>* | = | The SIP proxy server port number (1025 ~ 65535). |
| `uritype SIP` | = | The profile uses SIP URI. |
| `uritype TEL` | = | The profile uses TEL URI. |
| *<pbit>* | = | The IEEE 802.1p priority tag for SIP and RTP packets (0 ~ 7). |
| *<dscp>* | = | The DiffServ Code Point for SIP and RTP packets (0 ~ 63). |
| `keepalive` | = | Turn SIP session keepalive off or on. When this is on, the SIP UA periodically sends SIP session refresh requests. |
| *<se>* | = | The minimum session expiration time in seconds (90 ~ 65535) |
| `prack` | = | The PRovisional ACKnowledgement response sent in reply to a SIP INVITE request. PRACK support can be activated (`prack on`) or deactivated (`prack off`). |

This command creates and configures a SIP profile. The values of the default SIP profile “DEFVAL” are as follows:

- SIP server domain name: 0.0.0.0
- SIP registrar server domain name: 0.0.0.0
- SIP proxy server domain name: 0.0.0.0
- SIP server port number: 5060
- SIP registrar server port number: 5060
- SIP proxy server port number: 5060
- URI type: SIP
- IEEE 802.1p tag: 7
- DSCP tag: 48
- Keep alive: off
- PRACK: off

The following example shows a command configuring a SIP profile named “sip10” with the following settings:

- SIP server domain name: host1.domain1
- SIP registrar server domain name: host2.domain2
- SIP proxy server domain name: host3.domain3
- SIP server port number: 5061
- SIP registrar server port number: 5062
- SIP proxy server port number: 5063
- URI type: SIP
- IEEE 802.1p tag: 5
- DSCP tag: 36
- Keep alive: on
- SE: 1000

- PRACK: on

```
ras> profile voip sip set sip10 host1.domain1 host2.domain2 host3.domain3
sipport 5061 regsvrport 5062 proxysvrport 5063 uritype sip pbit 5 dscp 36
keepalive on 1000 prack on
```

### 30.17.4 profile voip sip show Command

**Syntax**:

`profile voip sip show [<name>]`

This command displays the settings of the specified SIP profile, or displays the names of all SIP profiles if none is specified. An example is shown next.

```
ras> profile voip sip show
sip profile(s):
--------------------
1. DEFVAL
2. sip10

ras> profile voip sip show sip10
sip profile    : sip10
sip-dn         : host1.domain1
sip port       : 5061
regsvr-dn      : host2.domain2
regsvr-port    : 5062
proxysvr-dn    : host3.domain3
proxysvr-port  : 5063
uritype        : SIP
pbit           : 5
dscp           : 36
keepalive      : on 1000
prack          : on
```

## 30.18 profile voip sip callsvc Commands

Use these commands to set up and manage the VoIP call service profiles. The call service profiles contain details about individual SIP accounts, as well as controlling the call services the subscribers can use.

### 30.18.1 profile voip sip callsvc delete Command

Syntax:

`profile voip sip callsvc delete <name>`

This command removes the specified SIP call service profile. An example is shown to delete the call service profile named “sp16”.

```
ras> profile voip sip callsvc delete sp16
```

## 30.18.2 profile voip sip callsvc map Command

Syntax:

```
profile voip sip callsvc map <name>
```

This command displays which subscribers use the specified SIP call service profile. An example is shown, displaying the ports that use a SIP call service profile named “sip-cs001” (ports 1 to 38 on slot 4).

```
ras> profile voip sip callsvc map sip-cs001
slot                        port
---- ----------------------------------------------
              1         2         3         4
     12345678901234567890123456789012345678901234567890
   3
   4 VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV----------
   5
   6
   7
   8 ------------------------
   9
  10
```

## 30.18.3 profile voip sip callsvc set Command

Syntax:

```
profile voip sip callsvc set <name>
 [keypattern <pattern-table>]
 [nopassword | {password <password>}
 [registration off|{on [<re>]}]
 [numberplan off|on {<cc> <ndc> <numberplan-table>}]
 [localhelp off|on {<tel-number> <localhelp-table>
 [<tel-number> <localhelp-table>...]}]
 [dnd on|off]
 [dtmf bypass|rfc2833|sipinfo|rfc2833like|plaintext]
 [callhold on|off]
 [callwait on|off]
 [callreturn on|off]
 [cidcw on|off]
 [clip on|off]
 [clir on|off]
 [calltransfer on|off]
 [fax t38|g711]
 [flash
invite|rfc2833|rfc2833like|sipinfo1|sipinfo2|sipinfo3|sipinfo4|{sipinfo5
[<rc>]}|{sipinfo6 [<si>]}
 [localcall on|off]
 [mwi on|off]
 [reanswer <ra>]
```

where

| | | |
|---|---|---|
| `keypattern` | = | Has the call service profile use a VoIP key pattern. |
| `<pattern-table>` | = | Specify the VoIP key pattern to use. |
| `nopassword` | = | The call service profile does not require a password (default). |
| `password` | = | The call service profile requires a password. |
| *`<password>`* | = | The call service profile's password. |
| `registration` | = | When this is `off`. the call service profile does not use the registration timeout feature.<br>Choose `on` and enter a time period (`<re>`) to have the system use the registration timeout feature. If the system does not receive a registration confirmation message from the SIP server in the time specified, it drops the connection.<br>Select `off` to not use the registration timeout feature. |
| *`re`* | = | This is the registration expiration time in seconds, 120~65535. |
| `numberplan` | = | When this is `off`, the call service profile does not reference a configured numbering plan. When this is `on`, the call service profile references the specified numbering plan. |
| *`<cc>`* | = | The country code. This defines the digits the numbering plan inserts when a rule contains "\c". |
| *`<ndc>`* | = | The national destination code. This defines the digits the numbering plan inserts when a rule contains "\d". |
| *`<numberplan-table>`* | = | The numbering plan this call service set is to use. |
| `localhelp` | = | When this is `off`, the call service profile does not have users access a local help table when they call a specific telephone number.<br>To have this call service profile use a local help table, choose `on` and specify a telephone number (*`tel-number`*) and the name of the local help table (*`localhelp-table`*) users are to access when they call the telephone number. |
| *`<tel-number>`* | = | The local help telephone number, up to 15 characters. |
| *`<localhelp-table>`* | = | The name of the local help table name, up to 31 characters |
| `dnd` | = | Do not Disturb allowed/prohibited. |
| `dtmf bypass` | = | The system does not relay DTMF signals. |
| `dtmf rfc2833` | = | The system relays DTMF signals according to RFC 2833. |
| `dtmf sipinfo` | = | The system relays DTMF signals as SIP INFO messages. |
| `dtmf rfc2833like` | = | The system relays DTMF signals as SIP INFO messages, but carried as RFC 2833 payload. |
| `callhold` | = | Call holding allowed/prohibited. |
| `callwait` | = | Call waiting allowed/prohibited. |
| `callreturn` | = | Call return allowed/prohibited. |
| `cidcw` | = | Calling Identity Delivery on Call Waiting allowed/prohibited. |
| `clip` | = | Caller Line Identification Presentation allowed/prohibited. |

| | | |
|---|---|---|
| `clir` | = | Caller Line Identification Restriction allowed/prohibited. |
| `calltransfer` | = | Call transferring allowed/prohibited. |
| `fax g711` | = | The system relays fax signals according to ITU-T G.711. |
| `fax t38` | = | The system relays fax signals according to ITU-T T-38. |
| `flash` | = | Select the method the system uses to process the flash signal from a user. |
| `invite` | = | Relays flash by SIP INVITE signal. |
| `rfc2833` | = | Relays flash according to RFC 2833. |
| `rfc2833like` | = | Relays flash in SIP INFO packets, but carried as RFC 2833 payload |
| `sipinfo1` | = | Relays flash in SIP INFO packets (a `signal=16` message) |
| `sipinfo2` | = | Relays flash in SIP INFO packets (a `signal=hf` message) |
| `sipinfo3` | = | Relays flash in SIP INFO packets (a `signal=hook-flash` message) |
| `sipinfo4` | = | Relays flash in SIP INFO packets (a plain text “FLASH” message). |
| `sipinfo5` | = | Relays flash in SIP INFO packets (multiple SIP messages). The message content is determined by the characters you enter for <*rc*>. A separate SIP INFO message is sent for each character you enter. |
| `sipinfo6` | = | Relays flash in SIP INFO packets (where the content of the message is determined by the text you enter for <*si*>). |
| `localcall` | = | Sets whether or not to allow subscribers to call other subscribers if the system’s connection to the SIP server is not available. |
| `mwi` | = | Turns the message waiting indicator on or off. |
| `reanswer` | = | When the system is using v5sip mode, use this field to set the reanswer time period. The reanswer time controls the length of time between the user hanging up the phone, and the call being disconnected (the BYE request being sent). |
| *ra* | = | The reanswer time period in seconds (0-30) after the user hangs up the phone before disconnecting the call. |

This command creates and configures a SIP call service profile. The values of the default SIP call service profile are as follows:

- Password: none.
- Key pattern table: DEFVAL
- Registration timeout: on 3600 seconds
- DND: on
- Call holding: on
- Call waiting: on
- Call return: on
- CLIP: on
- CLIR: on
- Call transferring: on
- CIDCW : on
- fax: G.711
- DTMF: bypass
- Local call: off

- Flash: invite
- MWI: on
- Reanswer time: 0
- Numbering plan: off.
- Local help: off

The following example shows a command configuring a SIP call service profile named “csp1” with the following settings:

- Password: “1959”
- Numbering plan: on
- Country code: 49
- National destination code: 40
- Numbering plan table: “plan9”
- call holding: off
- call waiting: off
- call transferring: on
- CLIP: off
- CLIR: on
- DND: on
- DTMF: SIP INFO
- Fax: T-38

```
ras> profile voip sip callsvc set csp1 password 1959 numberplan on 49 40
plan9 callhold off callwait off calltransfer on clip off clir on dnd on dtmf
sipinfo fax t38
```

## 30.18.4 profile voip sip callsvc show Command

Syntax:

`profile voip sip callsvc show [<`*name*`>]`

This command displays the settings of the specified SIP call service profile, or displays the names of all call service profiles if none is specified. An example is shown next.

```
ras> profile voip sip callsvc show
callservice profile(s):
----------------------
1. DEFVAL
2. csp1
3. csp2
4. 10ut

ras> profile voip sip callsvc show
callservice profile(s):
----------------------
1. DEFVAL

ras> profile voip sip callsvc show DEFVAL
callsvc profile      : DEFVAL
password             :
keypattern table     : DEFVAL
registration         : on 3600 seconds
dnd                  : on
callhold             : on
callwait             : on
callreturn           : on
clip                 : on
clir                 : on
calltransfer         : on
cidcw                : on
fax                  : g711
dtmf                 : bypass
localcall            : off
flash                : invite
mwi                  : on
reanswer time        : 0
numberplan           : off
localhelp            : off
```

## 30.19 profile voip sip dialplan Commands

Use these commands to set up and manage the VoIP dial plan (or number plan) profiles. The dial plan profiles are used to configure the system to identify specific types of phone numbers dialed by a user, and to process the number before transmission by deleting, replacing or adding digits according to the relevant rule.

### 30.19.1 profile voip sip dialplan delete Command

Syntax:

`profile voip sip dialplan delete <profile>`

This command removes the specified SIP dial plan profile. An example is shown to delete the call service profile named “dialplan_profile”.

```
ras> profile voip sip dialplan delete dialplan_profile
```

## 30.19.2 profile voip sip dialplan map Command

Syntax:

`profile voip sip dialplan map <profile>`

This command displays subscribers referenced by the specified one. An example is shown to display the call service profile named “dialplan_profile”.

```
ras> profile voip sip dialplan map dialplan_profile
slot                        port
---- ------------------------------------------------------------------------
--
               1         2         3         4         5         6         7

12345678901234567890123456789012345678901234567890123456789012345678901234567890
   3 ------------------------------------------------
   4 ------------------------------------------------
   5 ------------------------------------------------
   6 ------------------------
   7 ------------------------------------------------
   8
   9 ------------------------------------------------
  10 ------------------------------------------------------------------------
```

## 30.19.3 profile voip sip dialplan set Command

Syntax:

`profile voip sip dialplan set <profile> <index> [<dialplan-table>]`
`where`

| | | |
|---|---|---|
| *<index>* | = | The index number for an entry in the dial plan table (1~32). |
| *<dialplan-table>* | = | The dialplan table name (<=31 characters). |

This command sets the specified SIP dial plan profile. An example is shown to set the dial plan profile named “dialplan_profile”.

```
ras> profile voip sip dialplan set dialplan_profile 1 dialplan1
```

## 30.19.4 profile voip sip dialplan show Command

Syntax:

`profile voip sip dialplan show <profile>`

This command shows SIP dial plan profile or the specified SIP dial plan profile. An example is shown to display all dial plan profiles.

```
ras> profile voip sip dialplan show
Dialplan Name(s):
----------------------
1. DEFVAL
2. dialplan_profile
```

# 31

# show Commands

This chapter shows you how to use the `show` commands.

## 31.1 show Commands Overview

The `show` commands display runtime status information.

## 31.2 show Commands Summary

The following table lists the `show` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 240** show Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `show` | `adsl` | `linedata` | *<slot-port>* | Displays an ADSL port's line bit allocation. | L |
| | | `linegain` | *<slot-port>* | Displays the ADSL line gain. | L |
| | | `linehlog` | | Displays ADSL line channel characteristics. The format provides magnitude values in a logarithmic scale. | L |
| | | `lineqln` | | This command displays the Quiet Line Noise level on a line. This is the rms (root mean square) level of the noise present on the line for a DMT tone when no ADSL or VDSL signals are present. It is measured in dBm/Hz. The QLN can be used in analyzing crosstalk. | L |
| | | `linetssi` | | Displays the ADSL line's upstream and downstream linear TSSI (transmitter spectrum shaping) parameters. | L |
| | `arp` | | | Displays the ARP table. | L |
| | `atm` | *<slot-port>*\|*<slot-port-vpi/vci>* [reset] | | Displays ATM traffic counters. | L |
| | `cfm` | `mep` | | Displays all MEPs (maintenance end points) on the system. | L |

**Table 240** show Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | dhcp | counter | <*slot*>\|<*slot-port*> | Displays port DHCP statistics. | L |
| | | snoop | <*slot-port*> | Displays port DHCP snooping information. | L |
| | dot3ad | [<*slot*>] | | Displays the (IEEE 802.3ad) link aggregation settings. | L |
| | enet | <giga-port> [<*vid*>]\|<*slot*> | | Displays Ethernet packet counters. | L |
| | gbond | <*slot*> [*bond_name*] | | Displays gbond settings on a line card.<br>*bond_name*: The name of a port bonding group. | L |
| | igmp | info | | Displays IGMP related statistics. | L |
| | | group | [<*vid*> <*group_ip*>] | Displays the learned IGMP group settings and status. | L |
| | | port | info <*slot-port*> | Displays IGMP related information on the port. | L |
| | | | group <*slot-port*> | Displays joint IGMP group information on the port. | L |
| | ip | | | Displays management IP settings. | L |
| | ipbpvc | arpproxy | all\|domain [<*domain*>]\|edgerouter [<*ip-address*> <*vid*>]\|interface [<*ip/mask*> <*vid*>] | Displays the whole ARP table or the ARP table for a domain, an edge router or an interface.<br>Age time information is included. | L |
| | | interface | [<*ip/mask*>\|<*vid*>\|<*ip/mask*> <*vid*>] | Displays runtime interfaces. | L |
| | | route | [<*domain*>]\|[<*ip/mask*>]\|[<*domain*> <*ip/mask*>]] | Display runtime routing table. | L |
| | lineinfo | <*slot-port*> | | Displays line information. | L |
| | lineperf | <*slot-port*> | | Displays line performance statistics. | L |
| | linerate | <*slot-port*> | | Displays line rate values. | L |
| | linestat | <*slot-port*> | | Displays link status. | L |
| | mac | [<giga-port>\|<*mac*>\|<*slot*>\|<*slot-port*>\|vid <*vid1*>[-<*vid2*>]] | | Displays a port's IEEE 802.1d MAC address forwarding table. | L |
| | monitor | <*slot*> | | Displays a card's hardware monitor statistics. | L |

**Table 240** show Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | mstp | <*mstid*> [<*end_mstid*>] | | Displays multiple tree spanning protocol information for the Ethernet ports.<br>*mstid*: This is the multiple tree spanning protocol index number.<br>*end_mstid*: Specify the last MTSP in a range of MTSPs to be displayed. | L |
| | packet | <*slot-port*> | | Displays a port's packet counter. | L |
| | paepvc | counter | <*slot-port*>\|<*slot-port-vpi/vci*> | Displays PAE PVC counter statistics. | L |
| | | session | <*slot-port*>\|<*slot-port-vpi/vci*> | Displays PAE PVC session information. | L |
| | performance | <*slot-port*> curr\|15min\|1day | | Displays a DSL port's performance counters. | L |
| | sys | | | Displays the CPU utilization and memory usage status. | L |
| | rmon | stats\|history <*giga-port*> | | Displays Gigabit Ethernet interface link RMON information. | L |
| | user | | | Displays information on logged in users. * denotes your session. | L |
| | vdsl | linebandplane | <*slot-port*> | Displays the connected VDSL upstream/downstream line band plan. | L |
| | | linedata | <*slot-port*> | Displays an VDSL port's line bit allocation. | L |
| | | linegain | <*slot-port*> | Displays the VDSL line gain. | L |
| | | linehlog | <*slot-port*> | Displays VDSL line channel characteristics. The format provides magnitude values in a logarithmic scale. | L |
| | | lineqln | <*slot-port*> | This command displays the Quiet Line Noise level on a line. This is the rms (root mean square) level of the noise present on the line for a DMT tone when no ADSL or VDSL signals are present. It is measured in dBm/Hz. The QLN can be used in analyzing crosstalk. | L |
| | | linetssi | <*slot-port*> | Displays the VDSL line's TSSI parameters. | L |
| | vlan | [<*vid*>]\|[<*start-vid*> <*end-vid*>] | | Displays current VLANs. | L |

**Table 240** show Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | voip | h248 | mg <*slot*> [<*mg_name*>] | Displays the registration status of the media gateway.<br>*mg_name*: The name of the media gateway. | L |
| | voip | sip | serverstate <*slot*> [<*proxysvr-ip*> \| <*proxysvr-dn*>] | Displays the status of SIP proxy server while the "local call" feature is enabled.<br>*proxysvr-ip*: The IP address of the SIP proxy server.<br>*proxysvr-dn*: The domain address of the SIP proxy server. | L |

# 31.3 show Commands

Use these commands to display runtime status information.

## 31.3.1 show adsl Commands

Use the `show adsl` commands to display the line information for an active ADSL line.

### 31.3.1.1 show adsl linedata Command

Syntax:

`show adsl linedata <slot-port>`

This command displays a ADSL port's line bit allocation.

Discrete Multi-Tone (DMT) modulation divides up a line’s bandwidth into tones. This command displays the number of bits transmitted for each tone. This can be used to determine the quality of the connection, whether a given sub-carrier loop has sufficient margins to support ADSL transmission rates, and possibly to determine whether certain specific types of interference or line attenuation exist. Refer to the ITU-T G.992.1 recommendation for more information on DMT.

The better (or shorter) the line, the higher the number of bits transmitted for a DMT tone. The maximum number of bits that can be transmitted per DMT tone is 15.

“usBit table” displays the number (in hexadecimal format) of bits transmitted per DMT tone for the upstream channel (from the subscriber’s DSL modem or router to the DSL line card).

“dsBit table” displays the number (in hexadecimal format) of bits received per DMT tone for the downstream channel (from the DSL line card) to the subscriber’s DSL modem or router).

“usSnr Table” displays the upstream (from the subscriber’s DSL modem or router to the DSL line card) Signal to Noise Ratio. The higher the number, the better the line quality for that tone.

The bit allocation contents are only valid when the link is up.

The following example displays the line bit allocation for DSL port 5 on the line card in slot 7. In the following example, the upstream channel is carried on tones 8 to 17 and the downstream channel is carried on tones 34 to 497 (space is left between the channels to avoid interference).

```
ras> show adsl linedata 7-5
slot-port=7-5, DSL line data
link      = link_up
savedData=true
    usBit Table
  1:00 00 00 00 00 00 00 07 08 09 0a 0b 0b 0c 0c 0d
 17:0d 0d 0d 0e 0d 0d 0d 0d 0d 0d 0d 0c 0b 0a 09 08
 33:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 49:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
    dsBit Table
  1:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 17:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 33:00 09 0a 0a 0a 0b 0b 0b 0b 0c 0c 0c 0c 0c 0d 0d
 49:0d 0d 0d 0d 0d 0e 0e 0e 0e 0e 0e 0e 0e 0e 0e 0e
 65:00 0e 0e 0e 0e 0e 0e 0e 0e 0e 0e 0e 0e 0e 0e 0e

---------------------------------------------- [Snip] ----------------------------------------------

433:0d 0d 0d 0d 0d 0d 0d 0d 0d 0d 0d 0d 0d 0d 0d 0d
449:0d 0d 0d 0d 0d 0d 0d 0d 0d 0d 0d 0d 0d 0d 0c 0d
465:0d 0c 0d 0c 0c 0c 0c 0c 0c 0c 0c 0c 0c 0c 0c 0c
481:0c 0c 0c 0c 0c 0c 0c 0c 0c 0c 0c 0c 0c 0c 0c 0c
497:0c 0c 0c 0c 0c 0b 0b 0b 0b 0b 0a 0a 09 08 08 05
    usSnr Table(dB)
 1~ 8:     0.00     0.00     0.00     0.00     0.00     0.00     0.00    40.96
 9~16:    46.37    48.65    51.67    54.03    53.81    57.19    56.49    59.87
17~24:    59.91    59.85    59.22    61.98    59.94    59.87    59.23    58.33
25~32:    57.80    57.39    57.39    55.57    52.70    49.45    45.75    43.45
33~40:     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
41~48:     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
49~56:     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
57~64:     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
```

### 31.3.1.2 show adsl linegain Command

Syntax:

`show adsl linegain <slot-port>`

This command displays the line gain of the active ADSL line. Line gain represents the signal input required to compensate for losses in signal strength at different frequencies.

```
ras> show adsl linegain 3-1
port 3-1:
near end: (dB)
           1      2      3      4      5      6      7      8      9     10
tone    ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
   0 :    0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.87   0.81   0.77
  10 :    0.64   0.87   0.72   0.87   0.74   0.58   0.60   0.58   0.63   0.64
  20 :    0.72   0.83   0.88   0.61   0.68   0.79   0.59   0.71   0.83   0.84
  30 :    0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
  40 :    0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
  50 :    0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
  60 :    0.00   0.00   0.00   0.00
```

The following table describes labels in this example.

**Table 241** show adsl tssi Command Display

| LABEL | DESCRIPTION |
|---|---|
| near end/far end | This shows the location of the line test. “near end” refers to upstream traffic, or traffic from the CPE device. “far end” refers to downstream traffic, or traffic from the CO device. |
| tone | This shows the frequency in increments of 4.3125 KHz. Single digit units on the top row are added to the units in tens on the left hand column to find the corresponding value in the table. For example, to find the line gain value for tone band 43, locate 40 in the left hand column and 3 in the top row. The intersection of the column 3 and row 40 gives a line gain value of 5. |

### 31.3.1.3 show adsl linehlog Command

Syntax:

`show adsl linehlog <slot-port>`

This command displays the loop response using a logarithmic scale. These values can then be used to estimate line characteristics such as the line make-up and length.

```
ras> show adsl linehlog 3-1
port 3-1:
near end: (dB)
           1      2      3      4      5      6      7      8      9     10
tone    ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
   0 :   -24.8     NA     NA     NA  -69.9  -29.5  -18.6   -8.3    0.3    1.4
  10 :     1.5    1.6    1.7    1.6    1.4    1.0    1.0    0.7    0.5    0.2
  20 :    -0.2   -0.5   -0.9   -1.2   -1.6   -1.9   -2.0   -2.2   -2.5   -3.1
  30 :    -6.0  -10.7     NA     NA     NA     NA     NA     NA     NA     NA
  40 :      NA     NA     NA     NA     NA     NA     NA     NA     NA     NA
  50 :      NA     NA     NA     NA     NA     NA     NA     NA     NA     NA
  60 :      NA     NA     NA     NA
```

The following table describes labels in this example.

**Table 242** show adsl tssi Command Display

| LABEL | DESCRIPTION |
|---|---|
| near end/far end | This shows the location of the line test. “near end” refers to upstream traffic, or traffic from the CPE device. “far end” refers to downstream traffic, or traffic from the CO device. |
| tone | This shows the frequency in increments of 4.3125 KHz. Single digit units on the top row are added to the units in tens on the left hand column to find the corresponding value in the table. For example, to find the Hlog value for tone band 43, locate 40 in the left hand column and 3 in the top row. The intersection of the column 3 and row 40 gives a Hlog value of 5. |

### 31.3.1.4 show adsl lineqln Command

Syntax:

`show adsl lineqln <slot-port>`

This command displays the Quiet Line Noise level on a line. This is the rms (root mean square) level of the noise present on the line for a DMT tone when no ADSL or DSL signals are present. It is measured in dBm/Hz. The QLN can be used in analyzing crosstalk.

The following example shows the Quiet Noise Level on port 1 of the line ADSL line card in slot 3.

```
ras> show adsl lineqln 3-1
port 3-1:
near end: (dB/Hz)
           1      2      3      4      5      6      7      8      9     10
tone    ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
   0 :      NA  -86.5  -86.5  -85.5  -85.0  -83.5  -82.0  -78.5  -69.0  -37.0
  10 :   -67.0  -76.0  -81.5  -76.5  -86.0  -75.5  -68.0  -37.5  -67.5  -75.0
  20 :   -83.5  -75.5  -82.5  -77.0  -70.0  -40.5  -72.5  -82.5  -90.0  -87.5
  30 :   -97.5  -95.5  -97.5  -99.5 -100.5 -101.5 -102.5 -104.0 -105.0 -105.5
  40 :  -106.5 -107.0 -108.0 -109.0 -109.5 -110.0 -110.5 -111.5 -111.5 -112.0
  50 :  -112.0 -113.5 -113.0 -114.0 -115.0 -115.5 -114.5 -114.5 -115.5 -117.0
  60 :   -116.0 -116.5 -116.5 -116.0
```

The following table describes labels in this example.

**Table 243** show adsl lineqln Command Display

| LABEL | DESCRIPTION |
|---|---|
| near end/far end | This shows the location of the line test. “near end” refers to upstream traffic, or traffic from the CPE device. “far end” refers to downstream traffic, or traffic from the CO device. |
| tone | This shows the frequency in increments of 4.3125 KHz. Single digit units on the top row are added to the units in tens on the left hand column to find the corresponding value in the table. For example, to find the QLN value for tone band 43, locate 40 in the left hand column and 3 in the top row. The intersection of the column 3 and row 40 gives a QLN value of 5. |

### 31.3.1.5 show adsl linetssi Command

Syntax:

`show adsl linetssi <slot-port>`

This command displays the TSSI (Transmitter Spectrum Shape Index) of transmission on the specified DSL line. This tests the variation of the actual PSD (Power Spectrum Density) from the specified PSD.

```
ras> show adsl linetssi 3-1
port 3-1:
near end: (No unit)
         tone    ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
   0 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  10 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  20 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  30 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  40 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  50 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  60 :  1.0000 1.0000 1.0000 1.0000

    Press any key to continue, 'e' to exit
far end: (No unit)
           1      2      3      4      5      6      7      8      9     10
tone    ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
   0 :  0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000
  10 :  0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1068
  20 :  0.1139 0.1216 0.1301 0.1389 0.1482 0.1581 0.1692 0.1805 0.1927 0.2062
  30 :  0.2201 0.2348 0.2513 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  40 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  50 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  60 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  70 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  80 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000

-------------------------------------[ snip ] ------------------------------

 360 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
 370 :  0.9999 0.9918 0.9811 0.9731 0.9627 0.9523 0.9446 0.9420 0.9420 0.9395
 380 :  0.9395 0.9370 0.9370 0.9370 0.9344 0.9344 0.9319 0.9319 0.9294 0.9294
 390 :  0.9268 0.9268 0.9243 0.9243 0.9218 0.9218 0.9193 0.9193 0.9169 0.9169
 400 :  0.9143 0.9143 0.9143 0.9118 0.9118 0.9094 0.9094 0.9069 0.9069 0.9045
 410 :  0.9045 0.9020 0.9020 0.8995 0.8995 0.8971 0.8971 0.8947 0.8947 0.8923
 420 :  0.8923 0.8923 0.8898 0.8898 0.8874 0.8874 0.8851 0.8851 0.8851 0.8826
 430 :  0.8826 0.8803 0.8803 0.8778 0.8778 0.8755 0.8755 0.8731 0.8731 0.8707
 440 :  0.8707 0.8684 0.8684 0.8660 0.8660 0.8636 0.8636 0.8636 0.8613 0.8613
 450 :  0.8590 0.8590 0.8567 0.8567 0.8544 0.8544 0.8520 0.8520 0.8497 0.8497
 460 :  0.8474 0.8474 0.8451 0.8451 0.8428 0.8428 0.8428 0.8405 0.8405 0.8382
 470 :  0.8382 0.8359 0.8359 0.8336 0.8336 0.8314 0.8314 0.8291 0.8291 0.8269
 480 :  0.8269 0.8246 0.8246 0.8223 0.8223 0.8201 0.8201 0.8201 0.8179 0.8179
 490 :  0.8157 0.8157 0.8135 0.8135 0.8113 0.8113 0.8090 0.8090 0.8068 0.8068
 500 :  0.8046 0.8046 0.8024 0.8024 0.8002 0.8002 0.8002 0.7980 0.7980 0.7959
 510 :  0.7959 0.7937
```

The following table describes labels in this example.

**Table 244** show adsl tssi Command Display

| LABEL | DESCRIPTION |
|---|---|
| near end/far end | This shows the location of the line test. “near end” refers to upstream traffic, or traffic from the CPE device. “far end” refers to downstream traffic, or traffic from the CO device. |
| tone | This shows the frequency in increments of 4.3125 KHz. Single digit units on the top row are added to the units in tens on the left hand column to find the corresponding value in the table. For example, to find the TSSi value for tone band 43, locate 40 in the left hand column and 3 in the top row. The intersection of the column 3 and row 40 gives a TSSi value of 5. |

## 31.3.2 show arp Command

Syntax:

```
show arp
```

This command displays the system’s IP Address Resolution Protocol table. This is the list of IP addresses and matching MAC addresses that the system has resolved.

An example is shown next.

```
ras> show arp
ip address       time ether address     interface
---------------- ----- ----------------- ----------
123.23.14.26      290 00:0d:60:cc:14:e9 outband
123.23.14.76      290 00:00:e8:97:70:64 outband
123.23.14.91      290 00:0a:e4:0a:76:21 outband
123.23.14.98      290 00:50:70:ff:f3:89 outband
123.23.15.97      300 08:00:46:74:0e:a5 outband
123.23.15.172     300 02:0e:a6:89:41:60 outband
123.23.15.254     300 00:04:80:9b:78:00 outband
arp entry: 7
```

## 31.3.3 show atm Command

Syntax:

```
show atm <slot-port>|<slot-port-vpi/vci> [reset]
```

This command displays ATM traffic counters. It can also reset the counters.

The following example displays the ATM traffic counters for DSL port 5 on the line card in slot 7.

```
ras> show atm 7-5
port 7-5
                       since pvc create     since last reset
                     -------------------- --------------------
rx cells           :                    0                    0
tx cells           :                    0                    0
rx rate    (byte/s):                    0                    0
tx rate    (byte/s):                    0                    0
crc errors         :                    0                    0
```

The following table describes labels in this example.

**Table 245** show atm Command Display

| LABEL | DESCRIPTION |
|---|---|
| rx cells | This field shows the number of ATM cells received on this port. |
| tx cells | This field shows the number of ATM cells transmitted on this port. |
| rx rate | This field shows the number of kilobytes per second received on this port. |
| tx rate | This field shows the number of kilobytes per second transmitted on this port. |
| crc errors | This field shows the number of Cyclic Redundancy Check errors on this port. |
| since pvc create | This column displays the ATM traffic statistics that have accumulated from when the PVC was created (either via command or the building of the DSL link). |
| since last reset | This column displays the ATM traffic statistics that have accumulated from the most recent time that the counters were reset. |

## 31.3.4 show cfm Command

Syntax:

```
show cfm mep
```

This command displays all CFM maintenance end point information.

The following is an example.

```
ras> show cfm mep
maintenance domain : MD_0
maintenance association : L2SW-DSLAM
MEP id status  mac               state             LastFailedOkUpTime
------ ------- ----------------- ----------------- ------------------
     1   local 00:13:49:98:23:4c connection active
```

## 31.3.5 show dot3ad Command

Syntax:

```
show dot3ad [<slot>]
```

This command displays the (IEEE 802.3ad) link aggregation settings.

The following is an example.

```
ras> show dot3ad
[aggregator info]
 tsub:
    state  : disable
    members: sub1 sub2
    links  :
    syncs  :
 tup:
    state  : disable
    members: up1 up2
    links  :
    syncs  :
```

## 31.3.6 show dhcp counter Command

Syntax:

`show dhcp counter <slot>|<slot-port>`

This command displays the number of DHCP related packets received on the port. The following displays an example (refer to Section 5.2 on page 94 for field descriptions).

```
ras> show dhcp counter 2-2
card name: <NULL>
 port discover  offer   request    ack    overflow
----- -------- -------- -------- -------- --------
 2- 2        1        2        1        1        0
ras>
```

## 31.3.7 show dhcp snoop Command

Syntax:

`show dhcp snoop <slot-port>`

This command displays the DHCP snooping table on port 2 of the line card in slot 2 (refer to Section 5.4 on page 97 for field descriptions).

```
ras> show dhcp snoop 2-2
port 2-2: overflow 0
 idx       ip               mac         vid
 --- --------------- ----------------- ------
   1     123.23.19.4 00:50:ba:2c:70:e1  1
ras>
```

## 31.3.8 show enet Command

Syntax:

`show enet <enet1|enet2> [<vid>] |<slot>`

This command displays Ethernet packet counters for the specified Ethernet interface or DSL line card.

The following example displays the Ethernet packet counters for the Ethernet connection to the line card in slot 1.

```
ras> show enet up1
slot 1:
  link status: up        rate: 1000Mbps        up time:    6:08:07:50
  data rate (Tx/Rx): 0/0 kbps  utilization (Tx/Rx): 0/0
                             Rx                  Tx
                   ------------------- --------------------
  Bytes           :           357823090            115120466
  Pkts            :              969653              1480867
  UcastPkts       :              969652               975144
  NUcastPkts      :                   1               505723
  McastPkts       :                   0                    0
  BcastPkts       :                   1               505723
  Pause           :                   0                    0
  Pkt64           :                   0
  Pkt65~127       :             2146102
  Pkt128~255      :               68655
  Pkt256~511      :               14110
  Pkt512~1023     :               19605
  Pkt1024~1518    :              202045

    Press any key to continue, 'e' to exit
                             Rx                  Tx
                   ------------------- --------------------
  OverSizPkt      :                   0
  UndSizPkt       :                   0
  FCSErr          :                   0
  AlignErr        :                   0
  Jabber          :                   0
  Fragment        :                   0
  Dropped         :                   0
  Underrun        :                                        0
  ExCollisn       :                                        0
```

The following table describes labels in this example.

**Table 246** show enet Command Display

| LABEL | DESCRIPTION |
|---|---|
| link status | This shows whether or not the port has an active connection. |
| rate | This shows the connection speed for an active connection. |
| up time | This shows how long the connection has been active. |
| data rate (Tx/Rx) | This shows at what rate the port is currently sending or receiving data. |
| utilization (Tx/Rx): 0/0 | This shows what percent the port's current data rate is out of the connection's maximum rate. |
| Bytes | This is the number of octets of Ethernet frames received/transmitted that are from 0 to 1518 octets in size, counting the ones in bad packets, not counting framing bits but counting FCS (Frame Check Sequence) octets. An octet is an 8-bit binary digit (byte). |
| Pkts | This is the number of packets received/transmitted on this port (including multicast, unicast, broadcast and bad packets). |

**Table 246** show enet Command Display (continued)

| LABEL | DESCRIPTION |
|---|---|
| UcastPkts | This is the number of good unicast frames received/transmitted. |
| NUcastPkts | This is the number of good non-unicast frames received/transmitted. |
| MCastPkts | This is the number of good multicast frames received/transmitted of 64 to 1518 octets in length (for non VLAN) or 1522 octets (for VLAN), not including Broadcast frames. Frames with range or length errors are also not taken into account. |
| BCastPkts | This is the number of good broadcast frames received/transmitted of 64 to 1518 octets in length (for non VLAN) or 1522 octets (for VLAN), not including multicast frames. Frames with range or length errors are also not taken into account. |
| Pause | This is the number of valid IEEE 802.3x Pause frames received/transmitted on this port. |
| Pkt64 | This is the number of frames received/transmitted (including bad frames) that were 64 octets or less in length (this includes FCS octets but excludes framing bits). |
| Pkt65~127 | This is the number of frames received/transmitted (including bad frames) that were 65 to 127 octets in length (this includes FCS octets but excludes framing bits). |
| Pkt128~255 | This is the number of frames received and transmitted (including bad frames) that were 128 to 255 octets in length (this includes FCS octets but excludes framing bits). |
| Pkt256~511 | This is the number of frames received/transmitted (including bad frames) that were 256 to 511 octets in length (this includes FCS octets but excludes framing bits). |
| Pkt512~1023 | This is the number of frames received/transmitted (including bad frames) that were 512 to 1023 octets in length (this includes FCS octets but excludes framing bits). |
| Pkt1024~1518 | This is the number of frames received/transmitted (including bad frames) that were 1024 to 1518 octets in length (this includes FCS octets but excludes framing bits). |
| OverSizPkt | This is the number of frames received/transmitted that were bigger than 1518 (non VLAN) or 1522 (VLAN) octets and contained a valid FCS. |
| UndSizPkt | This is the number of frames received/transmitted that were less than 64 octets long and contained a valid FCS. |
| FCSErr | This is the number of frames received/transmitted with an integral length of 64 to 1518 octets and containing a Frame Check Sequence error. |
| AlignErr | This is the number of frames received/transmitted that were 64 to 1518 (non VLAN) or 1522 (VLAN) octets long but contained an invalid FCS and a non-integral number of octets. |
| Jabber | This is the number of frames received/transmitted that were longer than 1518 octets (non VLAN) or 1522 octets (VLAN) and contained an invalid FCS, including alignment errors. |
| Fragment | This is the number of frames received/transmitted that were less than 64 octets long, and contained an invalid FCS, including non-integral and integral lengths. |
| Dropped | This is the number of received/transmitted frames that were received by the system, but later dropped because of a lack of system resources. |
| Underrun | This is the number of outgoing frames that were less than 64 octets long. |
| ExCollisn | This is the number of frames for which transmission failed due to excessive collisions. Excessive collision is defined as the number of maximum collisions before the retransmission count is reset. |

## 31.3.9 show gbond Command

Syntax:

`show gbond <slot> [<gbond_name>]`

This command displays G.bond settings for the card inserted into the specified slot and, if specified, a G.bond group.

The following example shows G.bond settings on the G.bond group named “gbondgroup1” configured on the line card in slot 5. The ports 1 and 2 have set in the G.bond group, upstream (`us`) and downstream (`ds`) data rates for DSL lines on these ports are zero.

```
ras> show gbond 5 gbondgroup1
slot name
     port list                                              us(kbps) ds(kbps)
------------------------------------------------------------------------------
---
   5 gbondgroup1
     1,2                                                        0        0
```

## 31.3.10 show igmp Commands

Use the show igmp commands to display current IGMP settings and statistics. Use `multicast igmp enable` to enable IGMP first.

### 31.3.10.1 show igmp info Command

Syntax:

`show igmp info`

This command displays the current IGMP settings and the number of IGMP-related packets received. The following figure shows an example.

```
ras> show igmp info
mode is igmpsnooping
number of queries  = 0
number of reports  = 0
number of leaves   = 0
number of unknowns = 0
number of groups   = 0
ras>
```

### 31.3.10.2 show igmp group Command

Syntax:

`show igmp group [<vid> <mcast_ip>]`

where

*<mcast_ip>* = The multicast IP address.

This command displays the IGMP group information that is learned on the system or from the specified VLAN.

```
ras> show igmp group
[multicast group info]
vid  multicast group port                 slot             timestamp
---- -------------- -------------------- ---------------- --------------
ras>
```

### 31.3.10.3 show igmp port info Command

Syntax:

`show igmp port info <slot-port>`

This command displays the current IGMP settings and the number of IGMP-related packets received. The following figure shows the IGMP packet counters for port 1 on the line card in slot 3.

```
ras> show igmp port info 3-1
 port group_cnt query_cnt  join_cnt leave_cnt
----- --------- --------- --------- ---------
 3- 1         0         0         0         0
ras>
```

### 31.3.10.4 show igmp port group Command

Syntax:

`show igmp port group <slot-port>`

This command displays the IGMP groups a port joins. The following figure shows an example for port 1 on the line card in slot 3.

```
ras> show igmp port group 3-1
 port  vid       mcast_ip         client ip
----- ------ --------------- ----------------
ras>
```

## 31.3.11 show ip Command

Syntax:

`show ip`

This command displays the management IP settings and statistics. An example is shown next.

```
ras> show ip
               outband[enif0]   inband[swif0]
-------------- --------------- ---------------
inet          :    192.168.0.1   123.23.19.206
netmask       :  255.255.255.0   255.255.255.0
broadcast     :  192.168.0.255   123.23.19.255
mtu           :           1500            1500
vid           :              -               1
in octet      :              0        11201874
in unicast    :              0           26230
in multicast  :              0            3676
in discard    :              0             749
in error      :              0               0
in unknown    :              0             749
out octet     :              0          265141
out unicast   :              0            1646
out multicast :              0               0
out discard   :              0               0
out error     :              0               0

ras>
```

## 31.3.12 show ipbpvc arpproxy Command

Syntax:

`show ipbpvc arpproxy < all | domain [<`*`domain-name`*`>] | edgerouter [<`*`ip-address`*`> <`*`vid`*`>] | interface [<`*`ip/mask`*`> <`*`vid`*`>]`

where

| | | |
|---|---|---|
| <*domain-name*> | = | The name of the domain. |
| <*ip-address*> | = | IP address, in dotted decimal notation. |
| <*mask*> | = | Number of bits <1..32> in the subnet mask. |
| <*vid*> | = | The ID (<1..4094>) of the VLAN. |

This command displays the specified learned ARP table entries.

An example is shown below.

```
ras> show ipbpvc arpproxy show
Domain Name: d01
ip              mac               port vpi   vci interface           vid type
--------------- ----------------- ---- --- ----- ------------------ ---- ---
192.168.2.2     00:05:5d:03:99:3a   22   0    33 192.168.2.0/24        3   D
192.168.2.254   00:13:49:95:03:07   50   -     - 192.168.2.254         2   U
*: the ARP is learned from DHCP and can't be flushed.
```

The following table describes the labels in this screen.

**Table 247** IPB ARP Proxy Show Command Output

| LABEL | DESCRIPTION |
|---|---|
| Domain Name | This field displays the name of the domain which has this ARP table. |
| ip | This field displays the IP address assigned to the specific device. |
| mac | This field displays the MAC (Media Access Control) address of the device. |
| port | This field displays the port number to which the device is connected. |
| vpi/vci | This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI) the device is using. The VPI and VCI identify a channel on this port. |
| interface | This field displays the name of the interface the device is using. |
| vid | This field displays the VLAN ID the device is using. |
| type | This field indicates whether this entry is used for upstream traffic (**U**, or uplink interface) or downstream traffic (**D**, or downlink interface). By default, all entries are for downstream traffic, unless the edge router is configured using the edge router commands (see Section 29.15 on page 556). |

## 31.3.13 show ipbpvc interface Command

Syntax:

```
show ipbpvc interface [<ip/mask>|<vid>|<ip/mask> <vid>]
```

where

<*ip/mask*> = IP address, in dotted decimal notation. Number of bits <0..32> in the subnet mask.

<*vid*> = The ID (<1..4094>) of the VLAN.

This command displays the (run-time) downlink interfaces for the selected range of IP addresses and/or VLAN. This table includes all the forwarding information for downstream traffic, whether learned by snooping DHCP packets or provided manually.

An example is shown next.

```
ras> show ipbpvc interface
ip/mask            vid  slot port vpi vci
------------------ ---- ---- ---- --- ----
192.168.3.0/24     402  -    -    -   -
```

## 31.3.14 show ipbpvc route Command

Syntax:

```
show ipbpvc route [<domain-name>|<ip/mask>|<domain-name> <ip/mask>]
```

where

<*domain-name*> = The name of the domain.

<*ip/mask*> = IP address, in dotted decimal notation. Number of bits <1..32> in the subnet mask.

This command displays the (run-time) routing table(s) for the selected domain or range of IP addresses. This table includes all the entries, whether added automatically by the system or provided manually.

An example is shown next.

```
ras> show ipbpvc route
domain                          ip/mask            nexthop         mtrc pr type
------------------------------- ------------------ --------------- ---- -- ---
ISP1                            0.0.0.0/0          123.23.19.254   15   0  U
ISP1                            123.23.19.249/32   -               -    -  U
ISP1                            123.23.19.254/32   -               -    -  U
ISP1                            192.169.1.0/24     123.23.19.249   5    0  U
example                         192.168.1.200/32   -               -    -  U
```

The `type` field indicates whether this entry is used for upstream traffic (**U**, or uplink interface) or downstream traffic (**D**, or downlink interface). By default, all entries are for downstream traffic, unless the **Edge Router IP** is configured in the edge router commands (see Section 29.15 on page 556).

The other output values correspond to the input values of other IP bridge routing table commands.

## 31.3.15 show lineinfo Command

Syntax:

`show lineinfo <slot-port>`

This command shows the line operating values of a port.

### 31.3.15.1 xDSL Line Card

The following example displays the line operating values for port 5 on the ADSL line card in slot 7.

```
ras> show lineinfo 7-5
slot-port=1-1, DSL line info
link                 = link_up
service type         = adsl2plus_mode
coding mode          = Concatenated (trellis and RS) coding
us interleave delay = 18 ms
ds interleave delay = 6 ms
us inp               = 2.1 DMT symbol(s)
ds inp               = 0.5 DMT symbol(s)
us output power      = 9.6 dBm
ds output power      = 13.7 dBm
country code         = 0000
provider code        = 5443544e("TCTN")
```

The following table describes labels in this example.

**Table 248** show lineinfo Command Display

| LABEL | DESCRIPTION |
|---|---|
| link | This displays the connection status of the DSL link. |
| service type | This is the ADSL standard that the port is using. |
| coding mode | Trellis coding helps to reduce the noise in ADSL transmissions. Trellis may reduce throughput but it makes the connection more stable.<br>"RS" coding stands for Reed-Solomon error correction. |
| us interleave delay | This is the numbers of milliseconds of interleave delay for upstream transmissions. |
| ds interleave delay | This is the numbers of milliseconds of interleave delay for downstream transmissions. |
| us inp | This is the number of impulse noise protection DMT symbols for upstream transmissions. |
| ds inp | This is the number of impulse noise protection DMT symbols for downstream transmissions. |
| us output power | This is the power output of the subscriber's DSL modem or router. The total output power of the transceiver varies with the line length and quality. |
| ds output power | This is the DSP port's output power. The total output power of the transceiver varies with the length and line quality. The farther away the subscriber's ADSL modem or router is or the more interference there is on the line, the higher the power will be. |
| country code | This is the country code acquired from the subscriber's ADSL device during negotiation/provisioning message interchanges. The country code is from the Vendor ID (see ITU-T G.994.1). |
| provider code | This is the provider code acquired from the subscriber's ADSL device during negotiation/provisioning message interchanges. The provider code includes the Vendor ID and Version Number obtained from the Vendor ID. |

### 31.3.15.2 VoIP Line Card

The following example displays the line operating values for port 8 on the VoIP line card in slot 4.

```
ras> show lineinfo 4-8
slot-port=4-8, VOP line info
sipLocalUri    : local1
sipRemoteUri   : remote1
rtpTxCodecType : G.711a
rtpRxCodecType : G.711a
rtpTxPt        : 332
rtpRxPt        : 423
rtpLocalIp     : 111.11.11.1
rtpRemoteIp    : 122.22.22.2
rtpLocalPort   : 5060
rtpRemotePort  : 5060
```

The following table describes labels in this example.

**Table 249** show lineinfo Command Display (VoIP)

| LABEL | DESCRIPTION |
|---|---|
| sipLocalUri | This shows the SIP local URI. |
| sipRemoteUri | This shows the SIP remote URI. |
| rtpTxCodecType | This shows the voice codec used for transmitting data. |
| rtpRxCodecType | This shows the voice codec used for receiving data. |
| rtpTxPt | This shows the total number of RTP packets transmitted from this port since the system was started. |
| rtpRxPt | This shows the total number of RTP packets received by this port since the system was started. |
| rtpLocalIp | This is the local IP address. |
| rtpRemoteIp | This is the remote IP address. |
| rtpLocalPort | This is the local port used for VoIP. |
| rtpRemotePort | This is the port on the remote device used for VoIP. |

## 31.3.16 show linerate Command

Syntax:

`show linerate <slot-port>`

This command displays an ADSL port's line rate information.

The following example displays the line operating values for ADSL port 5 on the line card in slot 7.

```
ras> show linerate 7-5
slot-port=7-5, DSL line rate
link                 = link_up
                       upstream   downstream
                       ---------- ----------
payload rate   (kbps)=        999      23995
actual rate    (kbps)=       1008      24004
attainable rate(kbps)=       1013      24634
noise margin     (dB)=       18.8       12.5
attenuation      (dB)=        0.8        0.0
```

The following table describes labels in this example.

**Table 250** Line Rate Information

| LABEL | DESCRIPTION |
|---|---|
| The rate fields display the transmission rates. “Line Down” indicates that the ADSL port is not connected to a subscriber. | |
| up/down stream | Upstream refers to traffic coming into the DSL line card from the subscriber's ADSL modem or router. Downstream refers to traffic going out from the DSL line card to the subscriber's ADSL modem or router. |
| payload rate | These are the data (the payload data without transport layer protocol headers and traffic) transfer rates (in Kbps) at which the port is receiving and sending data. |

**Table 250** Line Rate Information (continued)

| LABEL | DESCRIPTION |
|---|---|
| actual rate | These are the data transfer rates (in Kbps) at which the port is receiving and sending data. |
| attainable rate | These are the highest theoretically possible transfer rates (in Kbps) at which the port could receive and send data. |
| noise margin | These are the DSL line's noise margins. Measured in decibels (dB). |
| attenuation | These are the reductions in amplitude of the DSL signals. Measured in decibels (dB). |

## 31.3.17 show linestat Command

Syntax:

`show linestat <slot-port>`

This command displays a port's link status.

The first example displays the link status for port 5 on the ADSL line card in slot 7.

```
ras> show linestat 7-5
                 usPayLoadRate dsPayLoadRate
port link            (kpbs)        (kpbs)    protocol       up time
---- ----------- ------------- ------------- -------------- --------------
   5 up                   999         23995 adsl2plus            4h58m
```

The second example displays the link status for port 8 on the VoIP line card in slot 4.

```
ras> show linestat 4-8
port linestate   phonestate
---- ----------- ------------
 4-8 off hook    conversation caller
```

## 31.3.18 show mac Command

Syntax:

`show mac [enet1|enet2|t1|<mac>|<slot>|<slot-port>|{vid <vid1>[-<vid2>]`

This command displays the IEEE 802.1d MAC address forwarding table. The following example displays the IEEE 802.1d MAC address forwarding table on Ethernet port 1.

```
ras> show mac enet1
vid  mac(total:   52)  port
---- ----------------- -----
   1 00:00:04:a0:00:31 enet1
   1 00:00:1c:d4:1c:f6 enet1
   1 00:00:e2:82:7d:90 enet1
   1 00:02:3f:6c:6f:0a enet1
```

### 31.3.19 show monitor Command

Syntax:

`show monitor <slot>`

This command displays a card’s hardware monitor statistics.

The following example displays the hardware monitor statistics for the card in slot 1.

```
ras> show monitor 1
'*' indicates a current alarm
voltage:
idx  volt             current  nominal  high_lmt low_lmt
---  ---------------- -------- -------- -------- --------
  1  2.5V                2.588    2.500    2.700    2.300
  2  1.25V               1.242    1.250    1.350    1.150
  3  3.3V                3.355    3.300    3.564    3.036
  4  1.3V                1.334    1.300    1.404    1.196
  5  15V                15.079   15.000   16.200   13.800
temperature:
idx  temperature      current  high_lmt low_lmt
---  ---------------- -------- -------- --------
  1  Temp1              37.500     81.0    -10.0
  2  Temp2              38.500     82.0    -10.0
  3  Temp3              33.750     78.0    -10.0
fan:
idx  fan speed        current  high_lmt low_lmt
---  ---------------- -------- -------- --------
  1 *FAN1                    0     7000     2000
  2  FAN2                 3588     7000     2000
  3  FAN3                 4005     7000     2000
cpu:
idx  cpu              current  high_lmt
---  ---------------- -------- --------
  1  CPU1                   6       70
memory:
idx  memory           current  high_lmt
---  ---------------- -------- --------
  1  MEM1                  63       85
packet buffer:
idx  packet buffer    current  high_lmt
---  ---------------- -------- --------
  1  PKTBUFF1               0       70

ras> show monitor 7
'*' indicates a current alarm
voltage:
idx  volt             current  nominal  high_lmt low_lmt
---  ---------------- -------- -------- -------- --------
  1   1.2V              1.187    1.200    1.284    1.116
  2 * 1.8V              1.976    1.800    1.926    1.674
  3   3.3V              3.263    3.300    3.531    3.069
  4  20.5V             20.596   20.500   22.550   18.450
temperature:
idx  temperature      current  high_lmt low_lmt
---  ---------------- -------- -------- --------
  1  Temp1              58.000   95.000  -50.000
  2  Temp2              54.000   90.000  -50.000
  3  Temp3              51.000   85.000  -50.000
ras>
```

This table describes labels in the example.

**Table 251** show monitor Command Information

| LABEL | DESCRIPTION |
|---|---|
| voltage | The power supply for each voltage has a sensor that can detect and report the voltage. |
| current | This is the present voltage reading. |
| nominal | This field displays the average voltage measured at this sensor. |
| high_lmt | This field displays the high voltage threshold for this sensor. |
| low_lmt | This field displays the low voltage threshold for this sensor. |
| temperature | This example displays the temperature measurements in degrees Celsius.<br>Each temperature sensor can detect and report the temperature. Temperature sensor 1 is near the ADSL line driver. Temperature sensor 2 is near the main chipset. Temperature sensor 3 is near the central processing unit. |
| current | This shows the current temperature at this sensor. |
| high_lmt | This field displays the high temperature threshold for this sensor. |
| low_lmt | This field displays the low temperature threshold for this sensor. |

## 31.3.20 show mstp Command

Syntax:

`show mstp <mstid> [<end_mstid>]`

where

`<mstid>` = The first MST region ID.

`<end_mstid>` = The last MST region ID.

This command displays information (such as bridge ID, topology change counter, etc.) of the specified MST region(s).

The following example displays MST region information for MST IDs 1 and 2.

```
ras> show mstp 1 2
[mstid 1]
BridgeID            : 0x8001-00a0c5da46eb
TimeSinceTopoChange :    3:08:23:03
TopoChangeCount     : 0
TopoIsChanging      : false
IntRootPortID       : 0x0000
IntRootID           : 0x8001-00a0c5da46eb
IntRootPathCost     : 0


[mstid 2]
BridgeID            : 0x8002-00a0c5da46eb
TimeSinceTopoChange :    3:08:22:54
TopoChangeCount     : 0
TopoIsChanging      : false
IntRootPortID       : 0x0000
IntRootID           : 0x8002-00a0c5da46eb
IntRootPathCost     : 0


ras>
```

## 31.3.21 show packet Command

Syntax:

`show packet <slot-port>`

This command displays a port's packet counter.

The following example displays the hardware monitor statistics for VDSL port 5 on the line card in slot 2.

```
ras> show packet 2-5
ifInOctets        = 66240
ifInUcastPkts     = 1029
ifInMcastPkts     = 149
ifInBcastPkts     = 202
ifInNUcastPkts    = 351
ifInDiscards      = 86
ifInErrors        = 0
ifInUnknownProtos = 0
ifOutOctets       = 2706192
ifOutUcastPkts    = 333
ifOutMcastPkts    = 55844
ifOutBcastPkts    = 111055
ifOutNUcastPkts   = 166899
ifOutDiscards     = 0
ifOutErrors       = 0
ras>
```

## 31.3.22 show paepvc counter Command

Syntax:

`show paepvc counter <slot-port>|<slot-port-vpi/vci>`

This command displays the PAE PVC statistics. The following example displays all PAE PVC counters for port 1 on the line card in slot 2.

```
ras> show paepvc counter 2-1
pvc 2-1-1/33
                                tx               rx
                          ---------------- ----------------
 ppp lcp config-request :                -                0
 ppp lcp echo-request   :                -                0
 ppp lcp echo-reply     :                -                0
 pppoe padi             :                0                -
 pppoe pado             :                -                0
 pppoe padr             :                0                -
 pppoe pads             :                -                0
 pppoe padt             :                0                0
 pppoe srvcname error   :                -                0
 pppoe acname error     :                -                0
 pppoe generic error    :                0                0

    Press any key to continue, 'e' to exit
ras>
```

The following table describes the counters.

**Table 252** show paepvc counter Command Fields

| FIELD | DESCRIPTION |
|---|---|
| ppp lcp config-request | This field displays the number of PPP config-request packets received. |
| ppp lcp echo-request | This field displays the number of PPP echo-request packets received. |
| ppp lcp echo-reply | This field displays the number of PPP echo-reply packets received. |
| pppoe padi | This field displays the number of PPPoE Active Discovery Initialization (PADI) packets transmitted. |
| pppoe pado | This field displays the number of PPPoE Active Discovery Offer (PADO) packets received. |
| pppoe padr | This field displays the number of PPPoE Active Discovery Request (PADR) packets transmitted. |
| pppoe pads | This field displays the number of PPPoE Active Discovery Session-Confirmation (PADS) packets received. |
| pppoe padt | This field displays the number of PPPoE Active Discovery Termination (PADT) packets received/transmitted. |
| pppoe srvcname error | This field displays the number of errors received for which the service-name request failed. |
| pppoe acname error | This field displays the number of errors received when the access concentrator experienced an error performing the host request. |
| pppoe generic error | This field displays the number of unrecoverable errors occurred. |

## 31.3.23 show paepvc session Command

Syntax:

`show paepvc session <slot-port>|<slot-port-vpi/vci>`

This command displays the PAE PVC session status. The following example displays the session status of all PAE PVC(s) on port 1 of the line card in slot 2.

```
ras> show paepvc session 2-1
pvc 2-1-1/33
session state : down
session id    : 0
session uptime: 0 secs
acname        :
srvcname      :

ras>
```

## 31.3.24 show performance Command

Syntax:

`show performance <slot-port> curr|15min|1day`

This command displays a DSL port's performance counters.

The following example displays the current performance counters for ADSL port 5 on the line card in slot 7.

```
ras> show perform 7-5 curr

PhysEntry
---------
vtuc/vtur CurrSnrMgn         = 12.5/5.5 dB
vtuc/vtur CurrAtn            = 1.9/0.0 dB
vtuc/vtur CurrOutputPwr      = 13.3/12.3 dBm
vtuc/vtur CurrAttainableRate = 24989/1013 kbps

ChanEntry
---------
vtuc/vtur ChanInterleaveDelay = 5/14 ms
vtuc/vtur ChanCurrTxRate      = 22912/999 kbps
vtuc/vtur ChanPrevTxRate      = 22912/999 kbps

PerfDataEntry
-------------
vtuc/vtur PerfLofs            = 3/0
vtuc/vtur PerfLoss            = 3/0
vtuc      PerfLols            = 3
atur      PerfLprs            = 0
vtuc/vtur PerfESs             = 0/1 seconds
vtuc      PerfInits           = 4
vtuc/vtur PerfStatSesL        = 0/1 seconds
vtuc/vtur PerfStatUasL        = 0/131 seconds
ras>
```

This table describes the fields.

“vtuc” statistics are for the downstream connection (or traffic). This is the connection going from the IES to the subscriber’s device.

“atur” statistics are for the upstream connection (or traffic). This is the connection coming from the subscriber’s device to the IES.

**Table 253** show performance curr

| LABEL | DESCRIPTION |
|---|---|
| CurrSnrMgn | These are the ADSL line’s current downstream and upstream signal to noise margins in decibels. |
| CurrAtn | These are the ADSL line’s current downstream and upstream line attenuation in decibels. |
| CurrOutputPwr | These are the ADSL line’s current downstream and upstream output powers in decibels. |
| CurrAttainableRate | These are the ADSL line’s current downstream and upstream attainable rates in decibels. |
| ChanInterleaveDelay | These are the numbers of milliseconds of interleave delay for downstream and upstream transmissions. |
| ChanCurrTxRate | These are the ADSL line’s current downstream and upstream transmission rates in decibels. |
| ChanPrevTxRate | These are the ADSL line’s previous downstream and upstream transmission rates in decibels. |
| PerfLofs | These are the ADSL line’s downstream and upstream numbers of Loss of frame Seconds that have occurred within the current 15 minute period. |
| PerfLoss | These are the ADSL line’s downstream and upstream numbers of Loss of signal Seconds that have occurred within the current 15 minute period. |
| PerfLols | These are the ADSL line’s downstream and upstream numbers of Loss of link Seconds that have occurred within the current 15 minute period. |
| PerfLprs | These are the ADSL line’s downstream and upstream numbers of Loss of power Seconds that have occurred within the current 15 minute period. |
| PerfESs | These are the ADSL line’s downstream and upstream numbers of Errored Seconds that have occurred within the current 15 minute period. |
| PerfInits | These are the ADSL line’s downstream and upstream numbers of initialization failure traps that have occurred within the current 15 minute period. |
| PerfStatSesL | These are the ADSL line’s downstream and upstream numbers of Severely errored seconds that have occurred within the current 15 minute period. |
| PerfStatUasL | These are the ADSL line’s downstream and upstream numbers of UnAvailable Seconds that have occurred within the current 15 minute period. |

The following example displays the one day performance counters for ADSL port 5 on the line card in slot 7.

```
ras> show performance 7-5 1day
PerfCurr1Day
-------------
vtuc/vtur TimeElapsed         = 57163/57163 seconds
vtuc/vtur Lofs                = 0/0 seconds
vtuc/vtur Loss                = 0/0 seconds
vtuc      Lols                = 0 seconds
vtuc      Lol                 = 0
vtur      Lprs                = 0 seconds
vtur      Lpr                 = 0
vtuc/vtur ESs                 = 0/0 seconds
vtuc      Inits               = 1
vtuc/vtur SesL                = 0/0 seconds
vtuc/vtur UasL                = 0/0 seconds

ChanPerfCurr1Day
-----------------
vtuc/vtur TimeElapsed         = 57163/57163 seconds

    Press any key to continue, 'e' to exit
PerfPrev1Day
------------
vtuc/vtur MoniSecs            = 0/0 seconds
vtuc/vtur Lofs                = 0/0 seconds
vtuc/vtur Loss                = 0/0 seconds
vtuc      Lols                = 0 seconds
atuc      Lol                 = 0
vtur      Lprs                = 0 seconds
vtur      Lpr                 = 0
vtuc/vtur ESs                 = 0/0 seconds
atuc      Inits               = 0
vtuc/vtur SesL                = 0/0 seconds
vtuc/vtur UasL                = 0/0 seconds
ChanPerfPrev1Day
----------------
vtuc/vtur MoniSecs            = 0/0 seconds
ras>
```

This table describes the fields that have not already been addressed.

**Table 254** show performance 1day

| LABEL | DESCRIPTION |
|---|---|
| TimeElapsed | This is the number of seconds that the DSL line card has been active. |
| MoniSecs | This is the number of seconds that the DSL line card was active during the measured period. |

## 31.3.25 show rmon Command

Syntax:

`show rmon stats|history <giga-port>`

This command displays subtending or uplink RMON MIB information. See RFC 1757 for information on the RMON MIBs.

The following example displays RMON history information for the Gigabit Ethernet uplink 1 interface.

```
ras> show rmon history up1
  historyControlInterval = 30 seconds
  Index          SampleIndex    IntervalStart  DropEvents     Octets
  Pkts           BroadcastPkts  MulticastPkts  CRCAlignErrors UndersizePkts
  OversizePkts   Fragments      Jabbers        Collisions     Utilization
  -------------- -------------- -------------- -------------- --------------
               1            227           6857              0              0
               0              0              0              0              0
               0              0              0              0              0

               1            226           6827              0              0
               0              0              0              0              0
               0              0              0              0              0

               1            225           6797              0              0
               0              0              0              0              0
               0              0              0              0              0

               1            224           6767              0              0
               0              0              0              0              0
               0              0              0              0              0

               1            223           6737              0              0
               0              0              0              0              0
               0              0              0              0              0
```

The following example displays RMON statistics for the Gigabit Ethernet uplink 1 interface.

```
ras> show rmon stats up1
  etherStatsDropEvents           = 0
  etherStatsOctets               = 0
  etherStatsPkts                 = 0
  etherStatsBroadcastPkts        = 0
  etherStatsMulticastPkts        = 0
  etherStatsCRCAlignErrors       = 0
  etherStatsUndersizePkts        = 0
  etherStatsOversizePkts         = 0
  etherStatsFragments            = 0
  etherStatsJabbers              = 0
  etherStatsCollisions           = 0
  etherStatsPkts64Octets         = 0
  etherStatsPkts65to127Octets    = 0
  etherStatsPkts128to255Octets   = 0
  etherStatsPkts256to511Octets   = 0
  etherStatsPkts512to1023Octets  = 0
  etherStatsPkts1024to1518Octets = 0
```

## 31.3.26 show sys Command

Syntax:

```
show sys
```

This command displays the system CPU utilization for the last 60 seconds and memory usage status. The following figure shows an example.

```
ras> show sys
CPU usage status:
  baseline 1456794 ticks
 sec   ticks   util  sec   ticks   util  sec   ticks   util  sec  ticks   util
   0 1356594   6.87    1 1363056   6.43    2 1337785   8.16    3 1340022   8.01
   4 1187472  18.48    5 1366325   6.21    6 1377483   5.44    7 1153896  20.79
   8 1321237   9.30    9 1361335   6.55   10 1367923   6.10   11 1365289   6.28
  12 1354417   7.02   13 1315779   9.68   14 1366581   6.19   15 1373105   5.74
  16 1306692  10.30   17 1364969   6.30   18 1370533   5.92   19 1301424  10.66
  20 1367778   6.11   21 1378912   5.34   22 1363950   6.37   23 1360289   6.62
  24 1306006  10.35   25 1246119  14.46   26 1364775   6.31   27 1372262   5.80
  28 1359724   6.66   29 1304459  10.45   30 1377936   5.41   31 1367812   6.10
  32 1359435   6.68   33 1356803   6.86   34 1141058  21.67   35 1358068   6.77
  36 1371992   5.82   37 1188738  18.40   38 1355139   6.97   39 1326071   8.97
  40 1362797   6.45   41 1353548   7.08   42 1340872   7.95   43 1329488   8.73
  44 1313818   9.81   45 1380668   5.22   46 1294721  11.12   47 1358091   6.77
  48 1350648   7.28   49 1315303   9.71   50 1358785   6.72   51 1356484   6.88
  52 1347292   7.51   53 1325328   9.02   54 1327612   8.86   55 1245649  14.49
  56 1364073   6.36   57 1370602   5.91   58 1336428   8.26   59 1330460   8.67
  60 1377002   5.47   61 1369616   5.98   62 1355618   6.94

    Press any key to continue, 'e' to exit
Memory usage status:
------Heap status------
heap size: 42115743 bytes
Heap usage: 31954492 bytes
Heap max. available block size: 10128472
mem alloc count: 226, mem free count: 0
```

## 31.3.27 show user Command

Syntax:

```
show user
```

This command displays information on logged in administrators. This information includes the type of session, user name, user's IP address and what time the management session started.

The following example shows one logged in user.

```
ras> show user
[session info ('*' denotes your session)]
session    user             remote ip       login time
---------- ---------------- --------------- -------------------
*telnet    admin            123.23.19.11    13:04:46 2005/06/01
```

## 31.3.28 show vdsl linebandplan Command

Syntax:

`show vdsl linebandplan <slot-port>`

This command displays a VDSL line bandplan.

The following example shows bandplan details on the VDSL line connected to port 22 of the line card in slot 2.

## 31.3.29 show vdsl linedata Command

Syntax:

`show vdsl linedata <slot-port>`

This command displays a VDSL port's line bit allocation.

The following example shows VDSL line data on port 22 on the VDSL line card in slot 2.

```
ras> show vdsl linedata 2-22
slot-port=2-22, DSL line data
link      = link_up

US0 carrier load: number of bits per symbol(tone)
---------  -- -- -- -- -- -- -- --   -- -- -- -- -- -- -- --
   0-  15: 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00
  16-  31: 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00
  32-  47: 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00
  48-  63: 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00
```

## 31.3.30 show vdsl linegain Command

Syntax:

`show vdsl linegain <slot-port>`

This command displays the line gain of the active VDSL line. Line gain represents the signal input required to compensate for losses in signal strength at different frequencies.

The following example shows the line gain on the VDSL line connected to port 22 on the device inserted into slot 2.

```
ras> show vdsl linegain 2-22
slot-port=2-22, DSL line gain

US0 gain measured (dB):
            1      2      3      4      5      6      7      8
tone     ------ ------ ------ ------ ------ ------ ------ ------
   0-   7:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
   8-  15:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
  16-  23:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
  24-  31:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
  32-  39:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
  40-  47:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
  48-  55:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
  56-  63:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
```

## 31.3.31 show vdsl linehlog Command

Syntax:

`show vdsl linehlog <slot-port>`

This command displays the loop response using a logarithmic scale. These values can then be used to estimate line characteristics such as line make-up and length.

The following example shows hlog values on the VDSL line connected to port 22 on the line card inserted in slot 2.

```
ras> show vdsl linehlog 2-22
slot-port=2-22, DSL line hlog
US HLOG values(dB):
              1      2      3      4      5      6      7      8
---------  ------ ------ ------ ------ ------ ------ ------ ------
   0-   7:     NA   -4.0   -2.2   -1.9   -1.6     NA     NA     NA
   8-  15:     NA     NA     NA     NA     NA     NA     NA     NA
  16-  23:     NA     NA     NA     NA     NA     NA     NA     NA
  24-  31:     NA     NA     NA     NA     NA     NA     NA     NA
  32-  39:     NA     NA     NA     NA     NA     NA     NA     NA
  40-  47:     NA     NA     NA     NA     NA     NA     NA     NA
  48-  55:     NA     NA     NA     NA     NA     NA     NA     NA
  56-  63:     NA     NA     NA     NA     NA     NA     NA     NA
  64-  71:     NA     NA     NA     NA     NA     NA     NA     NA
  72-  79:     NA     NA     NA     NA     NA     NA     NA     NA
  80-  87:     NA     NA     NA     NA     NA     NA     NA     NA
  88-  95:     NA     NA     NA     NA     NA     NA     NA     NA
  96- 103:     NA     NA     NA     NA     NA     NA     NA     NA
 104- 111:     NA     NA     NA     NA     NA     NA   -0.9   -0.9
 112- 119:   -0.9   -0.9   -1.0   -1.0   -1.0   -1.0   -1.0   -1.0
 120- 127:   -1.1   -1.1   -1.1   -1.1   -1.2   -1.2   -1.2   -1.2
 128- 135:   -1.2   -1.3   -1.3   -1.3   -1.4   -1.4   -1.4   -1.4
 136- 143:   -1.4   -1.5   -1.5   -1.5   -1.5   -1.5   -1.6   -1.6
```

## 31.3.32 show vdsl lineqln Command

Syntax:

`show vdsl lineqln <slot-port>`

This command displays the Quiet Line Noise level on a line. This is the rms (root mean square) level of the noise present on the line for a DMT tone when no ADSL or VDSL signals are present. It is measured in dBm/Hz. The QLN can be used in analyzing crosstalk.

The following example shows the Quiet Noise Level on port 22 of the line VDSL line card in slot 2.

```
ras> show vdsl lineqln 2-22
slot-port=2-22, DSL line qln
US QLN value:
              1      2      3      4      5      6      7      8
---------  ------ ------ ------ ------ ------ ------ ------ ------
   0-   7:     NA -121.0 -122.5 -126.5 -126.5     NA     NA     NA
   8-  15:     NA     NA     NA     NA     NA     NA     NA     NA
  16-  23:     NA     NA     NA     NA     NA     NA     NA     NA
  24-  31:     NA     NA     NA     NA     NA     NA     NA     NA
  32-  39:     NA     NA     NA     NA     NA     NA     NA     NA
  40-  47:     NA     NA     NA     NA     NA     NA     NA     NA
  48-  55:     NA     NA     NA     NA     NA     NA     NA     NA
  56-  63:     NA     NA     NA     NA     NA     NA     NA     NA
  64-  71:     NA     NA     NA     NA     NA     NA     NA     NA
  72-  79:     NA     NA     NA     NA     NA     NA     NA     NA
  80-  87:     NA     NA     NA     NA     NA     NA     NA     NA
  88-  95:     NA     NA     NA     NA     NA     NA     NA     NA
  96- 103:     NA     NA     NA     NA     NA     NA     NA     NA
 104- 111:     NA     NA     NA     NA     NA     NA -129.0 -129.5
 112- 119: -129.5 -129.5 -129.5 -129.5 -129.5 -129.5 -129.5 -129.5
 120- 127: -130.0 -129.5 -130.0 -129.5 -129.5 -129.5 -130.5 -129.5
 128- 135: -129.5 -130.0 -130.0 -130.0 -130.0 -130.0 -130.0 -130.0
 136- 143: -130.0 -130.0 -130.0 -130.0 -130.5 -130.5 -130.5 -130.5
 144- 151: -129.5 -130.0 -130.5 -130.5 -130.0 -131.0     NA     NA
```

The following table describes labels in this example.

**Table 255** show vdsl lineqln Command Display

| LABEL | DESCRIPTION |
|---|---|
| near end/far end | This shows the location of the line test. “near end” refers to upstream traffic, or traffic from the CPE device. “far end” refers to downstream traffic, or traffic from the CO device. |
| tone | This shows the frequency in increments of 4.3125 KHz. Single digit units on the top row are added to the units in tens on the left hand column to find the corresponding value in the table. For example, to find the QLN value for tone band 43, locate 40 in the left hand column and 3 in the top row. The intersection of the column 3 and row 40 gives a QLN value of 5. |

## 31.3.33 show vdsl linetssi Command

Syntax:

`show vdsl linetssi <slot-port>`

This command displays the TSSi (Transmit Spectrum Shaping index) of transmission on the specified line. This shows the variation of the actual PSD (Power Spectrum Density) from the PSD.

The following example shows TSSi levels on port 22 of the VDSL line card in slot 2.

```
ras> show vdsl linetssi 2-22
port 2-22:
           near end: (No unit)
           1      2      3      4      5      6      7      8      9     10
tone    ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
   0 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  10 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  20 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  30 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  40 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  50 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  60 :  1.0000 1.0000 1.0000 1.0000

    Press any key to continue, 'e' to exit
far end: (No unit)
           1      2      3      4      5      6      7      8      9     10
tone    ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
   0 :  0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000
  10 :  0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1000 0.1068
  20 :  0.1139 0.1216 0.1301 0.1389 0.1482 0.1581 0.1692 0.1805 0.1927 0.2062
  30 :  0.2201 0.2348 0.2513 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  40 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  50 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
  60 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000

-----------------------------------[ snip ]--------------------------------

 400 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
 410 :  1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
 420 :  0.9996 0.9996 0.9969 0.9969 0.9942 0.9942 0.9915 0.9915 0.9915 0.9888
 430 :  0.9888 0.9861 0.9861 0.9835 0.9835 0.9808 0.9808 0.9782 0.9782 0.9755
 440 :  0.9755 0.9729 0.9729 0.9702 0.9702 0.9676 0.9676 0.9676 0.9649 0.9649
 450 :  0.9623 0.9623 0.9597 0.9597 0.9571 0.9571 0.9545 0.9545 0.9519 0.9519
 460 :  0.9494 0.9494 0.9467 0.9467 0.9442 0.9442 0.9442 0.9416 0.9416 0.9390
 470 :  0.9390 0.9365 0.9365 0.9339 0.9339 0.9314 0.9314 0.9289 0.9289 0.9263
 480 :  0.9263 0.9238 0.9238 0.9213 0.9213 0.9188 0.9188 0.9188 0.9163 0.9163
 490 :  0.9138 0.9138 0.9113 0.9113 0.9088 0.9088 0.9064 0.9064 0.9039 0.9039
 500 :  0.9014 0.9014 0.8989 0.8989 0.8965 0.8965 0.8965 0.8940 0.8940 0.8916
 510 :  0.8916 0.8892
```

The following table describes labels in this example.

**Table 256** show vdsl tssi Command Display

| LABEL | DESCRIPTION |
|---|---|
| near end/far end | This shows the location of the line test. “near end” refers to upstream traffic, or traffic from the CPE device. “far end” refers to downstream traffic, or traffic from the CO device. |
| tone | This shows the frequency in increments of 4.3125 KHz. Single digit units on the top row are added to the units in tens on the left hand column to find the corresponding value in the table. For example, to find the TSSi value for tone band 43, locate 40 in the left hand column and 3 in the top row. The intersection of the column 3 and row 40 gives a TSSi value of 5. |

## 31.3.34 show vlan Command

Syntax:

```
show vlan [<vid>]

or

show vlan <start-vid> <end-vid>
```

This command displays the current VLANs.

The following example shows VLAN 1. It is set to send untagged Ethernet frames to the Gigabit Ethernet interfaces.

```
ras> show vlan
  vid sub1  sub2  up1   up2
---- ----- ----- ----- -----
   1   U     U     U     U
   3   -     -     -     -
   5   -     -     -     -
 101   -     -     -     -
4094   T     T     T     T
```

## 31.3.35 show voip h248 mg Command

Syntax:

```
show voip h248 mg <slot> [<mg_name>]
```

where

<*mg_name*> = The name of the media gateway.

This command displays the registration status of media gateways assigned to the line card in the specified slot.

The following example shows settings on media gateways assigned to the line card in slot.

```
ras> show voip h248 mg 4-1
MG                              state
------------------------------- --------
DEFVAL                          disable
mg1                             disable
```

## 31.3.36 show voip sip serverstate Command

Syntax:

`show voip sip serverstate <slot> [<proxysvr-ip> | <proxysvr-dn>]`

where

`<proxysvr-ip>` = The IP address of the SIP proxy server.

`<proxysvr-dn>]` = The domain address of the SIP proxy server.

This command displays the status of SIP proxy server assigned to the line card in the specified slot.

The following example shows settings on the SIP proxy server assigned to the line card in slot 3.

```
ras> show voip sip serverstate 3
SIP proxy server IP/domain name port state
------------------------------------------------------------- ----- -----
--
192.168.2.20 5060 alive
192.168.2.2 5062 lost
```

# 32

# switch Commands

This chapter shows you how to use the `switch` commands.

## 32.1 switch Commands Overview

The `switch` commands configure switching functions and manage the Ethernet interfaces.

## 32.2 General switch Command Parameters

The following table describes commonly used `switch` command parameter notation.

**Table 257** General switch Command Parameters

| NOTATION | DESCRIPTION |
|---|---|
| *profile* | The profile name configured in `profile switch` (<=32 characters). |
| *ma-name*: | A maintenance association name (<=32 characters). |
| *md-name* | The name of a maintenance domain (<= 32 characters). |
| *mep-id* | The maintenance association end point identifier (1~8191). |

## 32.3 switch Commands Summary

The following table lists the `switch` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 258** switch Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `switch` | `bandwidth` | `disable` | *<giga-port>* | Turns off bandwidth control on the specified port(s). | M |
| | | `enable` | *<giga-port>* | Turns on bandwidth control on the specified port(s). | M |
| | | `set` | *<giga-port>* *<ingress-rate>* *<egress-rate>* | Sets the incoming or outgoing bandwidth control for the specified Gigabit port(s) (0~1000 Mbps).<br>*ingress-rate*: The incoming bandwidth rate on a port.<br>*egress-rate*: The outgoing bandwidth rate on a port. | M |

**Table 258** switch Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | show | | Displays the bandwidth control settings. | L |
| | bcastctrl | show | | Displays broadcast and multicast storm control settings. | L |
| | | threshold | <*giga-port*> <*bc-limit*> <*mc-limit*> <*uu-limit*> | Sets the limitations of broadcast, multicast and unknown unicast packets, in packets per second for each trunk port (0~262143, -1 means no limit).<br>*bc-limit*: broadcast packet limit<br>*mc-limit*: multicast packet limit<br>*uu-limit*: unknown unicast packet limit | M |
| | cfm | disable | | Disables Connectivity Fault Management (CFM). | M |
| | | enable | | Enables CFM. | M |
| | | lbr | disable <*giga-port*>\|<*slot-port*> | Disables loopback testing on the specified port on a line card. | M |
| | | | enable <*giga-port*>\|<*slot-port*> | Enables loopback testing on the specified port on a line card. | M |
| | | | show | Displays loopback testing settings. | L |
| | | ma | delete <*md-name*> <*ma-name*> | Deletes a maintenance association (MA). | M |
| | | | meplist delete <*md-name*> <*ma-name*> <*ep-id*> | Deletes a list of MA end points (MEP). | M |
| | | | meplist set <*md-name*> <*ma-name*> <m*ep-id*> | Sets a list of MEP. | M |
| | | | set <*md-name*> <*ma-name*> <*primary-vlan*> [<*cci-interval*>] | Set an MA.<br>*primary-vlan*: primary served VLAN of this association.<br>*cci-interval*: continuity check message initiation interval, range is 4~7.<br>4: 1 s<br>5: 10 s<br>6: 1 min<br>7: 10 min | M |
| | | | vlan delete <*md-name*> <*ma-name*> <*vlan-id*> | Deletes a VLAN from an MA. | M |
| | | | vlan set <*md-name*> <*ma-name*> <*vlan-id*> | Associates a VLAN with an MA. | M |
| | | md | delete <*md-name*> | Deletes an MD. | M |
| | | | set <*md-name*> **<***level***>** | Sets an MD and it's level.<br>*level*: maintenance domain level, 0~7 | M |
| | | mep | delete <*md-name*> <*ma-name*> <*mep-id*> | Deletes a MEP. | M |

**Table 258** switch Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | | set <*md-name*> <*ma-name*> <*mep-id*> <*giga-port*>\|<*slot-port*> <*direction*> <*priority*> [cci <*cci-enabled*>] [alm <*alarm-time*>] [rst <*reset-time*>] [mac <*mac*>] | Sets an endpoint in the association.<br>*direction*: Choose up\|down. This is the active SAP direction, up means CFM PDUs are sent towards relay entity and then forwarded to other bridge ports, down means CFM PDUs are sent out the bridge port to network<br>*priority*: the priority carried in those CFM PDUs sent out from this endpoint<br>*cci-enabled*: indicate whether to issue CCM or not, default 0<br>0: disabled<br>1: enabled<br>*alarm-time*: The time before an alarm is issued, default 2.5 s, range is 2.5~10 s.<br>*reset-time*: The time before an alarm state is reset, default 10 s, range is 2.5~10 s.<br>Note: Before using this command, you must add the MEP ID in the legal MEP list of the MA using `switch cfm ma meplist set` command. | M |
| | | mip | delete <*md-name*> <*ma-name*> <*giga-port*>\|<*slot-port*> | Deletes a maintenance association intermediate point (MIP). | M |
| | | | set <*md-name*> <*ma-name*> <*giga-port*>\|<*sid*> <*mac*> | Sets a MIP. | M |
| | | show | [<*md-name*> <*ma-name*> | Displays MDs, a detailed MD or a detailed MA configuration. | L |
| | dot3ad | aggport | <*portlist*> t1\|t2\|t3\|t4\|none | Creates a link aggregation trunk groups. | M |
| | | disable | [t1\|t2\|t3\|t4] | Turns off link aggregation on the specified trunk group. | M |
| | | enable | [t1\|t2\|t3\|t4] [lacp] | Turns on link aggregation on the specified trunk group. `lacp` turns on LACP protocol. | M |
| | | lacp | priority <*priority*> | Sets the LACP system priority (0~65535). | M |
| | | | show | Displays LACP settings. | L |
| | | | timeout short\|long | Sets the time interval between exchanging LACP packets. | M |
| | | show | | Displays the link aggregation state. | L |
| | garptimer | join | <*join-msec*> | Sets the GARP timer's Join Timer (100~32766 milliseconds). | M |
| | | leave | <*leave-msec*> | Sets the GARP timer's Leave Timer in (201~65534 milliseconds). | M |

**Table 258** switch Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | leaveall | <*leaveall-msec*> | Sets the GARP timer's Leave All Timer in (202~65535 milliseconds) | M |
| | | set | <*join-msec*> <*leave-msec*> <*leaveall-msec*> | Sets GARP timers. | M |
| | | show | | Displays the GARP timer settings. | L |
| | isolation | disable | | Turns off the subscriber isolation feature. | M |
| | | enable | | Turns on the subscriber isolation feature. | M |
| | | vlan | delete <*vid*> | Deletes the specified isolation VLAN. | M |
| | | | set <*vid*> | Creates the specified isolation VLAN. | M |
| | | show | | Displays the subscriber isolation feature's current setting. | L |
| | mac | aging | set <aging time> | Sets the MAC aging out time period. | M |
| | | | show | Displays the MAC aging out time period. | M |
| | | flush | enet\|all | Clears the MAC table on the Ethernet ports or all ports (Ethernet and subscriber ports). | M |
| | mstp | cfgname | <*config name*> | Sets a descriptive name for the MSTP configuration. | M |
| | | disable | | Deactivates MSTP on the system. | M |
| | | enable | | Activates MSTP on the system. | M |
| | | fwdelay | <*fwdelay-sec*> | Sets the maximum time (between 4 and 30 seconds) a switch will wait before changing states | M |
| | | hellotime | <*hellotime-sec*> | Sets the time interval (between 1 and 10 seconds) between BPDU (Bridge Protocol Data Units) configuration message generations by the root switch. | M |
| | | maxage | <*maxage-sec*> | Sets the maximum time (between 6 and 40 seconds) a switch can wait without receiving a BPDU before attempting to reconfigure. | M |
| | | maxhops | <*max-hops*> | Sets the number of hops (between 1 and 255) in an MSTP region before the BPDU is discarded and the port information is aged. | M |
| | | priority | <*mstid*> <*priority*> | Sets the priority of the switch for the instance ranges. The lower the number, the more likely the switch will be chosen as the root bridge.<br>Enter 0, 4096, 8192, 12288, 16384, 20480, 24576, 28672, 32768, 36864, 40960, 45056, 49152, 53248, 57344 or 61440 in this field. | M |
| | | revision | <*revision level*> | Sets the configuration version number (0 - 65535). | M |
| | | show | | Displays MSTP settings. | L |
| | | version | rstp\|mstp | Sets the spanning tree protocol version the switch uses. | M |

**Table 258** switch Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | vlanmap | <*mstid*> <*vid*> [<*end_vid*>] | Sets the VLAN-MSTID mapping. | M |
| | port | disable | <*giga-port*> | Turns off data transmission on a port. | M |
| | | dscp | disable <*giga-port*> | Deactivates DSCP-IEEE 802.1p mappings on this port. | M |
| | | | enable <*giga-port*> | Activates DSCP-IEEE 802.1p mappings on this port. | M |
| | | | set <*giga-port*> <*srccp*> <*mapcp*> <*mappri*> | Sets DSCP-IEEE 802.1p mappings on this port.<br>*srccp*: source code point (0~63), for example: 1,3~5,10~15.<br>*mapcp*: code point, 0~63<br>*mappri*: priority, 0~7 | M |
| | | | show [<*giga-port*>] | Displays DSCP-IEEE 802.1p mappings on this port. | L |
| | | enable | <*giga-port*> | Turns on data transmission on a port. | M |
| | | flowctrl | disable <*giga-port*> | Turns off flow control on a port. | M |
| | | | enable <*giga-port*> | Turns on flow control on a port. | M |
| | | frametype | <*giga-port*> all\|tag | Sets the port(s) to accept VLAN tagged and untagged Ethernet frames or only tagged. | M |
| | | gvrp | disable <*giga-port*> | Turns on GVRP for a port(s). | M |
| | | | enable <*giga-port*> | Turns off GVRP for a port(s). | M |
| | | mode | <*giga-port*> uplink\|subtend | Sets a port to operate as uplink or subtending. | M |
| | | mstp | disable <*giga-port*> <*mstid*> | Deactivates MSTP on the port in the spanning tree instance. | M |
| | | | enable <*giga-port*> <*mstid*> | Activates MSTP on the port in the spanning tree instance. | M |
| | | | pathcost <*giga-port*> <*mstid*> <*pathcost*> | Sets the path cost (0~200 000 000). Enter 0 to have the system automatically set the path cost based on the link speed. | M |
| | | | p2plink <*giga-port*> auto\|enable\|disable | Enables point-to-point connection. | M |
| | | | priority <*giga-port*> <*mstid*> <*priority*> | Specify the priority (0~255) of the Ethernet port in the MST region. The system automatically rounds the number to the nearest multiple of 16. | M |
| | | | show <*mstid*> [<*end_mstid*>] | Displays MSTP settings. | L |
| | | name | <*giga-port*> <*name*> | Sets the name of a port. | M |
| | | priority | <*giga-port*> <*priority*> | Sets a port's default ingress user priority (0~7). | M |

**Table 258** switch Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | pvid | <*giga-port*> <*vid*> | Sets the PVID (Port VLAN ID) (1~4094) assigned to untagged frames or priority frames (0 VID) received on this port(s). | M |
| | | show | | Displays port settings. | L |
| | | speed | <*giga-port*> <*speed*> | Sets a port's speed and duplex mode. | M |
| | | vlantrunk | disable <*giga-port*> | Turns off VLAN trunking on a port to have it only accept frames with registered VIDs. | M |
| | | | enable <*giga-port*> | Turns on VLAN trunking on a port to have it accept frames with any VID. | M |
| | qschedule | set | <*giga-port*> spq<br>or<br><*giga-port*> wrr <wt0> <wt1> <wt2> <wt3> <wt4> <wt5> <wt6> <wt7> | Sets a port's queuing method and/or priority weight.<br>*spq*: strict priority queuing algorithm<br>*wrr*: weighted round robin queue algorithm<br>wt0~wt7: priority weight, 0~15 | M |
| | | show | | Displays the queuing settings. | L |
| | queuemap | set | <*priority*> <*queue*> | Sets a queue's priority. | M |
| | | show | | Displays the queues' priorities. | L |

# 32.4 switch bandwidth Commands

Use the `switch bandwidth` commands to configure bandwidth control.

## 32.4.1 switch bandwidth disable Command

Syntax:

`switch bandwidth enable <giga-port>`

where

<*giga-port*> = This represents Gigabit Ethernet uplink ports, subtending ports or all ports. Use `sub1|sub2|up1|up2|all` if trunking is not enabled. Use `sub|up|all` if trunking is enabled.

This command turns on bandwidth control on the specified Gigabit Ethernet interface (or all of them).

This example turns off bandwidth control for the uplink 1 port.

```
ras>  switch bandwidth disable up1
```

## 32.4.2 switch bandwidth enable Command

Syntax:

`switch bandwidth enable <giga-port>`

where

| | | |
|---|---|---|
| <*giga-port*> | = | This represents Gigabit Ethernet uplink ports, subtending ports or all ports. Use `sub1\|sub2\|up1\|up2\|all` if trunking is not enabled. Use `tsub\|tup\|all` if trunking is enabled. |

This command turns on bandwidth control on the specified port(s).

This example turns on bandwidth control for the subtending 2 port.

```
ras>  switch bandwidth enable sub2
```

## 32.4.3 switch bandwidth set Command

Syntax:

```
switch bandwidth set <giga-port> <ingress-rate> <egress-rate>
```

where

| | | |
|---|---|---|
| <*giga-port*> | = | This represents Gigabit Ethernet uplink ports, subtending ports or all ports. Use `sub1\|sub2\|up1\|up2\|all` if trunking is not enabled. Use `sub\|up\|all` if trunking is enabled. |
| <*ingress-rate*> | = | The maximum bandwidth allowed in megabits per second (Mbps) for the incoming traffic flow on a port. Use a number between 1 and 1000. |
| <*egress-rate*> | = | The maximum bandwidth allowed in megabits per second (Mbps) for the out-going traffic flow on a port. Use a number between 1 and 1000. |

This command sets the incoming or outgoing bandwidth control for the specified port(s).

This example sets the subtending 2 port to only allow 128 Mbps for incoming traffic and 512 Mbps for outgoing traffic.

```
ras>  switch bandwidth set sub2 128 512
```

## 32.4.4 switch bandwidth show Command

Syntax:

```
switch bandwidth show
```

This command displays the bandwidth control settings on the Gigabit Ethernet interfaces.

This example displays the bandwidth control settings on the Ethernet ports.

```
ras> switch bandwidth show
port  enable ingress(Mbps)  egress(Mbps)
----- ------ ------------- -------------
 sub1   -                0             0
 sub2   -                0             0
  up1   -                0             0
  up2   -                0             0
'0' = disable
```

"V" displays for ports that have bandwidth control enabled "-" displays for ports that do not.

# 32.5 switch bcasctrl Commands

Use the `switch bcasctrl` commands to configure broadcast storm control.

## 32.5.1 switch bcastctrl threshold Command

Syntax:

`switch bcasctrl threshold <giga-port> <bc-limit> <mc-limit> <uu-limit>`

where

| | | |
|---|---|---|
| *<giga-port>* | = | This represents Gigabit Ethernet uplink ports, subtending ports or all ports. Use `sub1\|sub2\|up1\|up2\|all` if trunking is not enabled. Use `sub\|up\|all` if trunking is enabled. |
| *<bc-limit>* | = | Sets how many broadcast packets the interface is allowed to receive per second. 0~262143, use -1 to disable. |
| *<mc-limit>* | = | Sets how many multicast packets the interface is allowed to receive per second. 0~262143, use -1 to disable. |
| *<uu-limit>* | = | Sets how many unknown unicast packets the interface is allowed to receive per second. 0~262143, use -1 to disable. |

This command sets the limitations of broadcast, multicast and unknown unicast packets, in packets per second for each Gigabit Ethernet port.

This example sets the subtending 1 interface to accept up to 80,000 broadcast packets, 100,000 multicast packets and 60,000 unknown unicast packets per second.

```
ras> switch bcastctrl threshold sub1 80000 100000 60000
```

## 32.5.2 switch bcastctrl show Command

Syntax:

`switch bcasctrl show`

This command displays the broadcast storm control settings. The following shows an example.

```
ras> switch bcastctrl show
port broadcast(pkt/s) multicast(pkt/s) uucast(pkt/s)
---- ---------------- ---------------- ----------------
sub1       80000           100000            60000
sub2        -                -                 -
 up1        -                -                 -
 up2        -                -                 -
ras>
```

## 32.5.3 switch cfm Commands

### 32.5.3.1 switch cfm disable

Syntax:

```
switch cfm disable
```

This command disables Connectivity Fault Management (CFM).

### 32.5.3.2 switch cfm enable

Syntax:

```
switch cfm enable
```

This command enables CFM.

### 32.5.3.3 switch cfm lbr enable

Syntax:

```
switch cfm lbr enable <giga-port>|<slot-port>
```

This command enables loopback testing on the specified port on a line card. The following shows an example.

```
ras> switch cfm lbr enable 6-1
```

### 32.5.3.4 switch cfm lbr disable

Syntax:

```
switch cfm lbr disable <giga-port>|<slot-port>
```

This command disables loopback testing on the specified port on a line card. The following example disables loopback testing on port 2 of the line card in slot 6.

```
ras> switch cfm lbr disable 6-2
```

### 32.5.3.5 switch cfm lbr show

Syntax:

```
switch cfm lbr show
```

This command displays loopback testing settings. The following shows an example.

```
ras> switch cfm lbr show
Giga port
---------
    sub1: disable
    sub2: disable
     up1: disable
     up2: disable
DSL port
--------
    6-1: enable
    6-2: disable
    6-3: enable
```

#### 32.5.3.6 switch cfm ma delete

Syntax:

`switch cfm ma delete <md-name> <ma-name>`

where

`<md-name>` = The maintenance domain.

`<ma-name>` = The maintenance association.

This command deletes the specified maintenance association.

#### 32.5.3.7 switch cfm ma meplist delete

Syntax:

`switch cfm ma meplist delete <md-name> <ma-name> <mep-id>`

where

`<mep-id>` = The end point identifier.

This command deletes a list of maintenance association end points. The following example deletes the end point identifier “2” from the list of end point identifiers for the maintenance association “ma1” in the maintenance domain “md1”.

```
ras> switch cfm meplist delete md1 ma1 2
```

#### 32.5.3.8 switch cfm ma meplist set

Syntax:

`switch cfm enable <md-name> <ma-name> <mep-id>`

This command sets a list of maintenance association end points. The following example sets the end point identifier “2” in the list of end point identifiers for the maintenance association “ma1” in the maintenance domain “md1”.

```
ras> switch cfm ma meplist set md1 ma1 2
```

#### 32.5.3.9 switch cfm ma set

Syntax:

`switch cfm ma set <md-name> <ma-name> <primary-vlan> [<cci-interval>]`

where

| | | |
|---|---|---|
| *<primary-vlan>* | = | The primary served VLAN of this association. |
| *<cci-interval>* | = | The continuity check message initiation interval. The range is 4~7 where:<br>4: 1 s<br>5: 10 s<br>6: 1 min<br>7: 10 min |

This command sets a maintenance association. The following sets up the maintenance association “ma1” with the primary VLAN identified by 2 and a CCI interval of 7 (10 minutes).

```
ras> switch cfm ma set md1 ma2 2 7
```

#### 32.5.3.10 switch cfm ma vlan delete

Syntax:

`switch cfm ma vlan delete <md-name> <ma-name> <vlan-id>`

This command deletes a VLAN from a maintenance association. The following example deletes the VLAN identified by 3 from the maintenance association “ma1”.

```
ras> switch cfm ma vlan delete md1 ma1 3
```

#### 32.5.3.11 switch cfm ma vlan set

Syntax:

`switch cfm ma vlan set <md-name> <ma-name> <vlan-id>`

This command adds a VLAN into a maintenance association. The following example sets the VLAN identified by 3 in the maintenance association “ma1”.

```
ras> switch cfm ma vlan set md1 ma1 3
```

#### 32.5.3.12 switch cfm md delete

Syntax:

`switch cfm md delete <md-name>`

This command deletes a maintenance domain.

#### 32.5.3.13 switch cfm md set

Syntax:

`switch cfm md set <md-name> <level>`

This command sets a maintenance domain and it’s level. The following example configures the maintenance domain “md1” with a level of 2.

```
ras> switch cfm md set md1 2
```

### 32.5.3.14 switch cfm mep delete

Syntax:

`switch cfm delete <md-name> <ma-name> <mep-id>`

This command deletes an endpoint in the maintenance association. The following shows an example.

```
ras> switch cfm md delete
```

### 32.5.3.15 switch cfm mep set

Syntax:

`switch cfm mep set <md-name> <ma-name> <mep-id> <giga-port>|<slot-port> <direction> <priority> [cci <cci-enabled>] [alm <alarm-time>] [rst <reset-time>] [mac <mac>]`

where

re

| | | |
|---|---|---|
| *<mep-id>* | | The maintenance end point identifier. |
| *<direction>* | = | Choose up\|down.<br>Specify whether to send CCMs (Connectivity Check Messages) from the specified end point (down) or from (up). Select up only when the link of the specified end point is down. |
| *<priority>* | = | Specifies the priority of the CCMs sent from this CFM end point. |
| *<cci-enabled>* | = | Indicates whether to issue CCM or not (default is 0).<br>0: disabled<br>1: enabled |
| *<alarm-time>* | = | This is the number of seconds (2.5~10) the system waits to send a local alarm after three times of CFM_ERROR detected. The default is 2.5 seconds. |
| *<reset-time>* | = | This is the number of seconds (2.5~10) the system waits to remove a local alarm after CFM_ERROR has been resolved and no other alarms occurred. The default is 10 seconds. |

This command configures a maintenance end point (MEP).

The example identifies the port 22 in the slot 2 using the MEP ID 22 and the port will send CCMs with priority 7.

```
ras> switch cfm mep set MD1 MA1 22 2-22 down 7 cci on
ras> switch cfm show MD1 MA1
maintenance association : MA1
cci interval            : 5
primary vlan            : 100
no. of maintenance ep   : 1
maintenance ep list     : 22
vlan list               : 100

MEP id slot-port direction Priority cciEnabled
------ --------- --------- -------- ----------
    22      2-22      down        7    enabled
mip:
```

### 32.5.3.16 switch cfm mip delete

Syntax:

`switch cfm mip delete <md-name> <ma-name> <giga-port>|<slot-port>`

This command deletes a maintenance association intermediate point. The following shows an example.

```
ras> switch cfm mip delete
```

### 32.5.3.17 switch cfm mip set

Syntax:

`switch cfm mip set <md-name> <ma-name> <giga-port>|<sid> [mac]`

This command sets a maintenance association intermediate point. The following shows an example.

```
ras> switch cfm mip set
```

### 32.5.3.18 switch cfm show

Syntax:

`switch cfm show [<md-name> <ma-name>]`

This command displays MDs, a detailed MD or a detailed MA information.

Three examples (show all MDs, a specified MD's detail, a specified MA's detail) are shown next.

```
ras> switch cfm show
status                    : enabled
no. of maintenance domain : 2

md name                           level no. of ma
--------------------------------- ----- ---------
MD_0                                  0         1
MD_1                                  7         0
ras>
ras> switch cfm show MD_0
maintenance domain             : MD_0
level                          : 0
no. of maintenance association : 1

ma name          cciInterval primary vlan no. of MEP
---------------- ----------- ------------ ----------
L2SW-DSLAM                4            1          1
ras>
ras> switch cfm show MD_0 L2SW-DSLAM
maintenance association : L2SW-DSLAM
cci interval            : 4
primary vlan            : 1
no. of maintenance ep   : 1
maintenance ep list     : 1 2 1001
vlan list               : 1

MEP id slot-port direction Priority cciEnabled
------ --------- --------- -------- ----------
     1     enet1      down        7    enabled
mip:    2-22
```

# 32.6 switch dot3ad Commands

Use the `switch dot31d` commands to configure static and dynamic (LACP) port trunking.

## 32.6.1 switch dot3ad lacp priority Command

Syntax:

`switch dot3ad lacp priority <priority>`

where

`<priority>` = LACP system priority is a number between 1 and 65,535. The switch with the lowest system priority (and lowest port number if system priority is the same) becomes the LACP "server". The LACP "server" controls the operation of LACP setup. Enter a number to set the priority of an active port using Link Aggregate Control Protocol (LACP). The smaller the number, the higher the priority level.

This command sets the LACP system priority.

This example sets the system's priority to 1000.

```
ras> switch dot3ad lacp priority 1000
```

## 32.6.2 switch dot3ad lacp timeout Command

Syntax:

`switch dot3ad lacp priority timeout short|long`

where

| | | |
|---|---|---|
| `timeout short\|long` | = | Timeout is the time interval between the individual port exchanges of LACP packets in order to check that the peer port in the trunk group is still up. If a port does not respond after three tries, then it is deemed to be "down" and is removed from the trunk. Set a short timeout (one second) for busy trunked links to ensure that disabled ports are removed from the trunk group as soon as possible. Select either short (1 second) or long (30 seconds). |

This command sets the time interval between exchanging LACP packets.

This example sets the system's to exchange LACP packets with the peer every second

```
ras> switch dot3ad lacp timeout short
```

## 32.6.3 switch dot3ad lacp show Command

Syntax:

`switch dot3ad lacp show`

This command displays the system's LACP settings. The following shows an example.

```
ras> switch dot3ad lacp show
priority : 1000
time out : short (1 sec)
ras>
```

## 32.6.4 switch dot3ad enable Command

Syntax:

`switch dot3ad enable sub|up [lacp]`

where

| | | |
|---|---|---|
| `sub` | = | The subtending ports |
| `up` | = | The uplink ports. |
| `[lacp}` | = | Turns on LACP protocol. |

This command turns on link aggregation on subtending or uplink ports.

This example sets the MSC to use link aggregation on the subtending ports. This also copies the configuration of subtending port one to subtending port two. The system asks you to confirm if this is what you want to do.

```
ras> switch dot3ad enable sub
Enabling sub trunking will copy configurations of port sub1 to port sub2
Configurations of port sub2 will be lost!
Do you wish to continue? ('y' to continue)
```

### 32.6.5 switch dot3ad disable Command

Syntax:

`switch dot3ad disable sub|up`

where

`sub` = The subtending ports

`up` = The uplink ports.

This command turns off link aggregation on subtending or uplink ports.

This example sets the MSC to not use link aggregation on the uplink ports.

```
ras> switch dot3ad disable up
```

### 32.6.6 switch dot3ad show Command

Syntax:

`switch dot3ad show`

This command displays the link aggregation state of the trunk groups.

This command displays the link aggregation state of the subtending and uplink ports.

Here is an example.

```
ras> switch dot3ad show
agg  enable  type  port
---- ------ ------ -------------------------------------------------
tsub   -    static sub1 sub2
tup    -    static up1 up2
```

“V” displays for trunking groups that have link aggregation enabled “-” displays for ports that do not.

## 32.7 switch garptimer Commands

Use the `switch garptimer` commands to configure GARP timeout periods.

## 32.7.1 switch garptimer show Command

Syntax:

```
switch garptimer show
```

This command displays the system's GARP timer settings, including the join, leave and leave-all timers. An example is shown next.

```
ras> switch garptimer show
join time     (ms): 200
leave time    (ms): 600
leaveall time (ms): 10000
ras>
```

## 32.7.2 switch garptimer join Command

Syntax:

```
switch garptimer join <join msec>
```

where

| | | |
|---|---|---|
| *<join msec>* | = | This sets the duration of the Join Period timer for GVRP in milliseconds. Each port has a Join Period timer. The allowed Join Time range is between 100 and 32767 milliseconds; the default is 200 milliseconds. |

This command sets the system's join period timer for GVRP in milliseconds.

Switches join VLANs by making a declaration. A declaration is made by issuing a Join message using GARP. GARP timers set declaration timeout values.

The following example sets the Join Timer to 300 milliseconds.

```
ras> switch garptimer join 300
```

## 32.7.3 switch garptimer leave Command

Syntax:

```
switch garptimer leave <leave msec>
```

where

| | | |
|---|---|---|
| *<leave msec>* | = | This sets the duration of the Leave Period timer for GVRP in milliseconds. Each port has a single Leave Period timer. Leave Time must be two times larger than Join Timer; the default is 600 milliseconds. The allowed Leave Time range is between 201 and 65534 milliseconds; the default is 600 milliseconds. |

This command sets the system's leave period timer for GVRP in milliseconds.

Switches join VLANs by making a declaration. Declarations are withdrawn by issuing a Leave message. GARP timers set declaration timeout values.

The following example sets the Leave Timer to 800 milliseconds.

```
ras> switch garptimer leave 800
```

## 32.7.4 switch garptimer leaveall Command

Syntax:

`switch garptimer leaveall <leaveall msec>`

where

| | | |
|---|---|---|
| *<leaveall msec>* | = | This sets the duration of the Leave All Period timer for GVRP in milliseconds. Each port has a single Leave All Period timer. Leave All Timer must be larger than Leave Timer. The allowed Leave Time range is between 201 and 65535 milliseconds; the default is 10000 milliseconds. |

This command sets the system's leave all period timer for GVRP in milliseconds.

Switches join VLANs by making a declaration. A declaration is made by issuing a Join message using GARP. A Leave All message terminates all registrations. GARP timers set declaration timeout values.

The following example sets the Leave All Timer to 11000 milliseconds.

```
ras> switch garptimer leaveall 11000
```

## 32.7.5 switch garptimer set Command

Syntax:

`switch garptimer set <join-msec> <leave-msec> <leaveall-msec>`

where

| | | |
|---|---|---|
| *<join msec>* | = | This sets the duration of the Join Period timer for GVRP in milliseconds. Each port has a Join Period timer. The allowed Join Time range is between 100 and 32767 milliseconds; the default is 200 milliseconds. |
| *<leave msec>* | = | This sets the duration of the Leave Period timer for GVRP in milliseconds. Each port has a single Leave Period timer. Leave Time must be two times larger than Join Timer; the default is 600 milliseconds. The allowed Leave Time range is between 201 and 65534 milliseconds; the default is 600 milliseconds. |
| *<leaveall msec>* | = | This sets the duration of the Leave All Period timer for GVRP in milliseconds. Each port has a single Leave All Period timer. Leave All Timer must be larger than Leave Timer. The allowed Leave Time range is between 201 and 65535 milliseconds; the default is 10000 milliseconds. |

This command sets the system's Join, Leave and Leave All timers.

The following example sets the Join Timer to 300 milliseconds, the Leave Timer to 900 milliseconds and the Leave All Timer to 12000 milliseconds.

```
ras> switch garptimer join 300 900 12000
```

# 32.8 switch isolation Commands

Use the `switch isolation` commands to configure the subscriber isolation feature. Use subscriber isolation to block communications between subscriber ports. When you enable subscriber isolation you do not need to configure the VLAN to isolate subscribers.

Turn on VLAN isolation to block communications between subscribers in different VLANs if you do not block communications between subscriber ports. For example, you might want to isolate some VLANs (for example, high-speed Internet) and not isolate other VLANs (for example, VoIP).

## 32.8.1 switch isolation show Command

Syntax:

`switch isolation show`

This command displays the system's subscriber isolation and VLAN isolation settings. An example is shown next.

```
ras> switch isolation show
port isolation :disabled
isolated vlan list:
----
5
938
```

## 32.8.2 switch isolation enable Command

Syntax:

`switch isolation enable`

This command turns on the system's subscriber isolation setting. An example is shown next.

```
ras> switch isolation enable
port isolation :enabled
ras>
```

## 32.8.3 switch isolation disable Command

Syntax:

`switch isolation disable`

This command turns off the system's subscriber isolation setting. An example is shown next.

```
ras> switch isolation disable
port isolation :enabled
ras>
```

## 32.8.4 switch isolation vlan delete Command

Syntax:

`switch isolation vlan delete <vid>`

where

`<vid>` = The VLAN ID [1 – 4094].

This command turns off per-VLAN isolation for the specified VLAN.

Per-VLAN isolation only works when the regular switch isolation feature is disabled (see Section 32.8.3 on page 693).

The following example turns off per-VLAN isolation for VLAN 5.

```
ras> switch isolation vlan delete 5
ras> switch isolation show
port isolation :disabled
isolated vlan list:
----
938
```

## 32.8.5 switch isolation vlan set Command

Syntax:

`switch isolation vlan set <vid>`

where

`<vid>` = The VLAN ID [1 – 4094].

This command turns on per-VLAN isolation for the specified VLAN.

Per-VLAN isolation only works when the regular switch isolation feature is disabled (see Section 32.8.3 on page 693).

The following example turns on per-VLAN isolation for VLAN 5.

```
ras> switch isolation vlan set 5
ras> switch isolation show
port isolation :disabled
isolated vlan list:
----
5
938
```

## 32.9 switch mac aging Commands

Syntax:

```
switch mac aging set <aging time>
switch mac aging show
```

where

| | | |
|---|---|---|
| *aging time* | = | Enter a number of seconds from 10 to 10,000. Enter 0 to disable the aging out of MAC addresses. |

Use these commands to configure and display the MAC aging out time period. This is how long all dynamically learned MAC addresses remain in the MAC address table before they age out (and must be relearned). This setting applies to both the MSC and any installed ELCs.

The following example displays the current MAC aging out period and then changes it to 500 seconds.

```
ras> switch mac aging show
Aging time : 300
ras> switch mac aging set 500
```

## 32.10 switch mstp Commands

Use the `switch mstp` commands to configure multiple spanning tree settings on the system.

### 32.10.1 switch mstp cfgname Command

Syntax:

```
switch mstp cfgname <config name>
```

where

| | | |
|---|---|---|
| <*config name*> | = | A unique name (up to 31 characters) that identifies an MST region. |

This command sets the switch to belong to the specified MST region.

The following example sets the switch to be a member of the `test` MST region.

```
ras> switch mstp cfgname test
```

## 32.10.2 switch mstp disable Command

Syntax:

`switch mstp disable`

This command deactivates the MSTP feature on the switch.

## 32.10.3 switch mstp enable Command

Syntax:

`switch mstp enable`

This command activates the MSTP feature on the system.

## 32.10.4 switch mstp fwdelay Command

Syntax:

`switch mstp fwdelay <fwdelay-sec>`

This command sets the forward delay period (between 4 and 30 seconds) the switch waits before changing states.

The following example sets the forward delay time to 15 seconds.

```
ras> switch mstp fwdelay 15
```

## 32.10.5 switch mstp hellotime Command

Syntax:

`switch mstp hellotime <hellotime-sec>`

This command sets the time interval (between 1 and 10 seconds) between BPDU (Bridge Protocol Data Units) configuration message generations by the root switch.

The following example sets the hello time to 5 seconds.

```
ras> switch mstp hellotime 5
```

## 32.10.6 switch mstp maxage Command

Syntax:

`switch mstp maxage <maxage-sec>`

This command sets the maximum time (between 6 and 40 seconds) a switch can wait without receiving a BPDU before attempting to reconfigure.

The following example sets the maximum age to 20 seconds.

```
ras> switch mstp maxage 20
```

## 32.10.7 switch mstp maxhops Command

Syntax:

`switch mstp maxhops <max-hops>`

This command sets the number of hops (between 1 and 255) in an MSTP region before the BPDU is discarded and the port information is aged.

The following example sets the maximum hop count to 20. After 20 hops (or passing through 20 devices), a BPDU is dropped.

```
ras> switch mstp maxhops 20
```

## 32.10.8 switch mstp priority Command

Syntax:

`switch mstp priority <mstid> <priority>`

where

| | | |
|---|---|---|
| *<mstid>* | = | Index number (between 0-16) to identify a spanning tree instance. For CIST, enter 0. To identify an MSTI, enter a number between 1 and 16. |
| *<priority>* | = | Priority level (0 ~ 61440) in increments of 4096. The system automatically rounds the number to the nearest multiples of 4096. |

This command sets the priority of the switch for the specific spanning tree instance. The lower the number, the more likely the switch will be chosen as the root bridge within the spanning tree instance.

The following example sets the priority of the switch to 24576 in the spanning tree instance 10.

```
ras> switch mstp priority 10 24576
```

## 32.10.9 switch mstp revision Command

Syntax:

`switch mstp revision <revision>`

This command sets a number to identify a region's configuration. Devices must have the same revision level to belong to the same region.

The following example sets the revision number of the switch to 1.

```
ras> switch mstp revision 1
```

## 32.10.10 switch mstp show Command

Syntax:

```
switch mstp show
```

This command displays the general MSTP settings on the switch. The following figure shows an example.

```
ras> switch mstp show
config name      : test
revision level   : 1
status           : disabled
priority         : 32768
hello time    (s): 5
max age       (s): 20
forward delay (s): 15
force version    : mstp
max hops         : 20

msti  priority
----- ------------------------------------------------
 1- 8 32768 32768 32768 32768 32768 32768 32768 32768
 9-16 32768 24576 32768 32768 32768 32768 32768 32768

mstid vid
----- ------------------------------------------------
    0 1,11-4094
    1 2
    2 3-10

vid       mstid
--------- -----
        1     0
        2     1
   3-  10     2
  11-4094     0

ras>
```

## 32.10.11 switch mstp version Command

Syntax:

```
switch mstp version <rstp|mstp>
```

This command sets the system to use and send BPDUs for the specified spanning tree protocol.

The following example sets the spanning tree protocol to RSTP.

```
ras> switch mstp version rstp
```

### 32.10.12 switch mstp vlanmap Command

Syntax:

`switch mstp vlanmap <mstid> <start_vid> <end_vid>`

where

| | | |
|---|---|---|
| *<mstid>* | = | Index number (between 0-16) to identify a spanning tree instance. For CIST, enter 0. To identify an MSTI, enter a number between 1 and 16. |
| *<start_vid>* | = | Start of the VLAN range. |
| *<end_vid>* | = | End of the VLAN range. |

This command creates a mapping of the specified VLAN range and spanning tree instance. You can map multiple VLANs to the same spanning tree instance. You cannot map a VLAN to multiple spanning tree instances. Devices in the same MST region must have the same VLAN-to-MST instance mapping(s).

Make sure the VLAN(s) is not already configured for multicasting or VLAN stacking.

The following example maps VLAN 2 to instance 1 and the VLAN range (3~10) to instance 2.

```
ras> switch mstp vlanmap 1 2 2
ras> switch mstp vlanmap 2 3 10
```

## 32.11 switch port Commands

Use these commands to manage the system's Gigabit Ethernet interfaces.

### 32.11.1 switch port disable Command

Syntax:

`switch port disable <giga-port>`

This command turns off data transmission on a Gigabit Ethernet interface.

The following example turns off the subtending 1 Gigabit Ethernet interface.

```
ras> switch port disable sub1
```

### 32.11.2 DSCP Overview

DiffServ Code Point (DSCP) is a field used for packet classification on DiffServ networks. The higher the value, the higher the priority. Lower-priority packets may be dropped if the total traffic exceeds the capacity of the network.

## 32.11.3 switch port dscp Commands

Use the `switch port DSCP` commands to show and configure the DSCP mapping and DSCP to IEEE 802.1p mapping for the Gigabit Ethernet interfaces.

### 32.11.3.1 switch port dscp disable Command

Syntax:

`switch port dscp disable <giga-port>`

This command turns off DSCP to DSCP mapping and DSCP to IEEE 802.1p mapping on a Gigabit Ethernet interface.

The following example turns off DSCP to DSCP mapping and DSCP to IEEE 802.1p mapping on the subtending 1 Gigabit Ethernet interface.

```
ras> switch port dscp disable sub1
```

### 32.11.3.2 switch port dscp enable Command

Syntax:

`switch port dscp enable <giga-port>`

This command turns on DSCP to DSCP mapping and DSCP to IEEE 802.1p mapping on a Gigabit Ethernet interface.

The following example turns on DSCP to DSCP mapping and DSCP to IEEE 802.1p mapping on the subtending 1 Gigabit Ethernet interface.

```
ras> switch port dscp enable sub1
```

### 32.11.3.3 switch port dscp set Command

Syntax:

`switch port dscp set <giga-port> <srccp> <mapcp> <mappri>`

where

| | |
|---|---|
| *<srccp>* | Specify a source DiffServ Code Point (DSCP) or points, 0~63. For example: `1,3~5,10~15` |
| *<mapcp>* | Specify the DSCP (0~63) to which you want to map the source DSCP (or DSCPs). |
| *<mappri>* | Specify the IEEE 802.1p priority (0~7) to which you would like to map the source DSCP (or DSCPs). |

This command configures DSCP to DSCP mapping and DSCP to IEEE 802.1p mapping on a Gigabit Ethernet interface. You can change the DSCP of received (IEEE 802.1p tagged) packets to a different DSCP. You can also map it to a specific IEEE 802.1p priority.

The following example sets subtending 1 Gigabit Ethernet interface to map packets with a source DSCP of 7 to a DSCP of 5 and a IEEE 802.1p priority of 1.

```
ras> switch port dscp set sub1 7 5 1
```

#### 32.11.3.4 switch port dscp show Command

Syntax:

`switch port dscp show [<giga-port>]`

This command displays the DSCP to DSCP mapping and DSCP to IEEE 802.1p mapping settings on a Gigabit Ethernet interface.

The following example displays the subtending 1 Gigabit Ethernet interface's DSCP to DSCP mapping and DSCP to IEEE 802.1p mapping settings.

```
ras> switch port dscp show sub1

sub1 dscp mapping(codepoint/priority): disabled
     00   01   02   03   04   05   06   07   08   09
   ---- ---- ---- ---- ---- ---- ---- ---- ---- ----
00  0/0  1/0  2/0  3/0  4/0  5/0  6/0  5/1  8/1  9/1
10 10/1 11/1 12/1 13/1 14/1 15/1 16/2 17/2 18/2 19/2
20 20/2 21/2 22/2 23/2 24/3 25/3 26/3 27/3 28/3 29/3
30 30/3 31/3 32/4 33/4 34/4 35/4 36/4 37/4 38/4 39/4
40 40/5 41/5 42/5 43/5 44/5 45/5 46/5 47/5 48/6 49/6
50 50/6 51/6 52/6 53/6 54/6 55/6 56/7 57/7 58/7 59/7
60 60/7 61/7 62/7 63/7
```

The top row and first column identify the source DSCP. The other rows identify the DSCP to which the source DSCP is mapped followed by the IEEE 802.1p priority to which it is mapped. The bolded section in this example shows that packets received with a DSCP of 7 get their code point changed to 5 and are given an IEEE 802.1p priority of 1.

### 32.11.4 switch port enable Command

Syntax:

`switch port enable <giga-port>`

This command turns on data transmission on a Gigabit Ethernet interface.

The following example turns on the subtending 1 Gigabit Ethernet interface.

```
ras> switch port enable sub1
```

### 32.11.5 switch port flowctrl disable Command

Syntax:

`switch port flowctrl disable <giga-port>`

This command turns off flow control on a Gigabit Ethernet interface.

The following example turns off the flow control on the subtending 1 Gigabit Ethernet interface.

```
ras> switch port flowctrl disable sub1
```

## 32.11.6 switch port flowctrl enable Command

Syntax:

`switch port flowctrl enable <giga-port>`

This command turns on flow control on a Gigabit Ethernet interface.

The following example turns on the flow control on the subtending 1 Gigabit Ethernet interface.

```
ras> switch port flowctrl enable sub1
```

## 32.11.7 switch port frametype Command

Syntax:

`switch port frametype <giga-port> all|tag`

where

`all|tag =` Specifies all Ethernet frames (tagged and untagged) or only tagged Ethernet frames.

This command sets the specified port to accept all Ethernet frames or only those with an IEEE 802.1Q VLAN tag.

The following example sets ports the subtending 1 Gigabit Ethernet interface to accept only tagged frames.

```
ras switch port frametype sub1 tag
```

## 32.11.8 switch port gvrp Commands

Use the `switch port gvrp` commands to configure GVRP settings for the Gigabit Ethernet interfaces.

### 32.11.8.1 switch port gvrp disable Command

Syntax:

`switch port gvrp disable <giga-port>`

This command turns off GVRP on a Gigabit Ethernet interface.

GVRP (GARP VLAN Registration Protocol) is a registration protocol that defines a way for switches to register necessary VLAN members on ports across the network. Disable GVRP to have the system not propagate VLAN information to other devices.

The following example turns off GVRP on the subtending 1 Gigabit Ethernet interface.

```
ras> switch port gvrp disable sub1
```

#### 32.11.8.2 switch port gvrp enable Command

Syntax:

`switch port gvrp enable <giga-port>`

This command turns on GVRP on a Gigabit Ethernet interface.

GVRP (GARP VLAN Registration Protocol) is a registration protocol that defines a way for switches to register necessary VLAN members on ports across the network. The system propagates VLAN information to other devices when you enable GVRP.

The following example turns on GVRP on the subtending 1 Gigabit Ethernet interface.

```
ras> switch port gvrp enable sub1
```

## 32.11.9 switch port mode Command

Syntax:

`switch port mode sub1|sub2|up1|up2 <uplink|subtend>`

This command sets a Gigabit Ethernet interface to function as uplink or subtending.

The following example sets the subtending 1 Gigabit Ethernet interface to uplink mode.

```
ras> switch port mode sub1 uplink
```

## 32.11.10 switch port mstp Commands

Use the `switch port mstp` commands to configure multiple spanning tree settings for the Gigabit Ethernet interfaces.

#### 32.11.10.1 switch port mstp disable Command

Syntax:

`switch port mstp disable sub1|sub2|up1|up2|all <mstid>`

where

| | | |
|---|---|---|
| *<mstid>* | = | A unique number to identify an MST region. Enter 0 to for CIST. For MSTI, enter a number between 1 and 16. |

This command disables MSTP on the specified Gigabit Ethernet interface port (or all of them) in the specified spanning tree instance. All MSTP packets to/from the specified spanning tree instance will be dropped on the port.

The following example disables MSTP on unlink port 1 in spanning tree instance 2.

```
ras> switch port mstp disable up1 2
```

#### 32.11.10.2 switch port mstp edgeport Command

Syntax:

`switch port mstp edgeport <giga-port> <mstid> <enable|disable>`

This command enables or disables the specified Gigabit Ethernet interface as an edge port that connects to a non-SPT device (such as a computer or hub).

The following example sets subtending port 2 as an edge port.

```
ras> switch port mstp edgeport sub2 enable
```

### 32.11.10.3 switch port mstp enable Command

Syntax:

`switch port mstp enable sub1|sub2|up1|up2|all <mstid>`

This command sets the specified Gigabit Ethernet interface to participate in the spanning tree instance.

The following example activates MSTP on all Gigabit Ethernet interfaces in the spanning tree instance 3.

```
ras> switch port mstp enable all 3
```

### 32.11.10.4 switch port mstp p2plink Command

Syntax:

`switch port mstp p2plink <giga-port> auto|enable|disable`

where

| | | |
|---|---|---|
| `auto` | = | The switch automatically determines if the link is point-to-point based on the port's duplex mode setting. |
| `enable` | = | Activates this feature on a full-duplex port that is connected directly to another switch port. |
| `disable` | = | Deactivates this feature on the port that is in half-duplex mode. |

Enable a point-to-point link between Gigabit Ethernet interfaces to increase the speed of convergence by allowing the network to determine the designated port faster. The port must be connected directly to another switch port.

The following example activates point-to-point link on uplink port 2.

```
ras> switch port mstp p2plink up2 enable
```

### 32.11.10.5 switch port mstp pathcost Command

Syntax:

`switch port mstp pathcost <giga-port> <mstid> <cost>`

This command sets the path cost of the specified Gigabit Ethernet interface in the spanning tree. The path cost can be between 0 and 200000000. A smaller number means a lower path cost. For paths with the same priority, the switch will select the one on lower interface number first. 0 sets the system automatically determines the path cost based on the line speed.

The following example sets the path cost of uplink interface 1 to 200 in spanning tree 10.

```
ras> switch port mstp pathcost up1 10 200
```

### 32.11.10.6 switch port mstp priority Command

Syntax:

`switch port mstp priority <giga-port> |all <mstid> <priority>`

This command sets the priority (between 0 and 255 in multiples of 16) of the Gigabit Ethernet interface in the specified spanning tree. When a loop occurs and two root ports have the same cost, the port with higher priority (lower numerical value) becomes the root port and the other port becomes an alternate port. For ports with the same priority, the switch will select the one on lower interface number first.

The following example sets the port priority of uplink interface 1 to 16 in spanning tree 10.

```
ras> switch port mstp priority up1 10 16
```

### 32.11.10.7 switch port mstp show Command

Syntax:

`switch port mstp show <mstid> [<end_mstid>]`

This command displays the specified MSTP's settings on each Gigabit Ethernet interface. The following example displays the port MSTP setting for spanning tree 10.

```
ras> switch port mstp show 10
[msti 10]
port  en  prio pathcost
---- ---- ---- ---------
sub1  -   128          0
sub2  -   128          0
 up1  V   128         16
 up2  -   128          0
```

## 32.11.11 switch port name Command

Syntax:

`switch port name <giga-port> <name>`

where

*<name>* = A name to identify the port.

This command sets the name of a Gigabit Ethernet interface.

The following example sets the name of uplink interface 1 to `xyz`.

```
ras>  switch port name up1 xyz
```

## 32.11.12 switch port priority Command

Syntax:

`switch port priority <giga-port> <priority>`

where

`<priority>` = The default ingress priority (0~7).

This command sets the default ingress user priority of a Gigabit Ethernet interface.

The following example sets the default priority of uplink interface 1 to 3.

```
ras> switch port priority up1 3
```

## 32.11.13 switch port pvid Command

Syntax:

`switch port pvid <giga-port> <vid>`

where

`<pvid>` = The default Port VLAN ID (PVID) assigned to untagged frames or priority-tagged frames received on this port. 1~4094.

This command sets the Port VLAN ID assigned to untagged frames or priority frames (0 VID) received on this port(s).

The following example sets the PVID of uplink interface 1 to 76.

```
ras>  switch port pvid up1 76
```

## 32.11.14 switch port show Command

Syntax:

`switch port show`

This command displays the settings for the system's Gigabit Ethernet interfaces. An example is shown next.

```
ras> switch port show
port       name        en  mode speed   fc  pvid prio gvrp ftype  vt  dscp
----- --------------- ---- ---- ------ ---- ---- ---- ---- ----- ---- ----
 sub1 Subtend1         V    up  auto    -   1    0     -   all    -    -
 sub2 Subtend2         V    up  auto    -   1    0     -   all    -    -
  up1 Uplink1          V    up  auto    -   1    0     -   all    -    -
  up2 Uplink2          V    up  auto    -   1    0     -   all    -    -
```

### 32.11.15 switch port speed Command

Syntax:

```
switch port speed <giga-port> <speed>
```

where

| | | |
|---|---|---|
| *<giga-port>* | = | This represents 1000BaseT uplink ports. The port speed is fixed for subtending ports and/or SFP slots that use a fiber-optic interface. Use `up1\|up2\|all` if trunking is not enabled. Use `tup\|all` if trunking is enabled. |
| *<speed>* | = | The port's speed and duplex mode.<br>Use `auto\|1000F\|100F\|100H`.<br>Auto or 1000 (Mbps) or 100 (Mbps) is to match the port speed of the WAN switch to which this port is to connect.<br>F is for full duplex communications or H for half duplex communications. |

This command sets the port speed and duplex of a 1000BaseT uplink port(s).

The following example sets the speed of the uplink 1 Gigabit Ethernet interface to 1000 Mbps and the duplex to full.

```
ras>  switch port speed up1 1000F
```

## 32.12 switch port vlantrunk Commands

Use these commands to turn VLAN trunking on or off for the Gigabit Ethernet interfaces.

### 32.12.1 switch port vlantrunk enable Command

Syntax:

```
switch port vlantrunk enable <giga-port>
```

where

| | | |
|---|---|---|
| *<giga-port>* | = | This represents Gigabit Ethernet uplink ports, subtending ports or all ports. Use `sub1\|sub2\|up1\|up2\|all` if trunking is not enabled. Use `tsub\|tup\|all` if trunking is enabled. |

This command sets a Gigabit Ethernet interface(s) to use VLAN trunking in order to accept frames with any VID.

The following example sets the subtending 1Gigabit Ethernet interface to use VLAN trunking.

```
ras>  switch port vlantrunk enable sub1
```

### 32.12.2 switch port vlantrunk disable Command

Syntax:

```
switch port vlantrunk disable <giga-port>
```

where

| | | |
|---|---|---|
| <*giga-port*> | = | This represents Gigabit Ethernet uplink ports, subtending ports or all ports. Use `sub1\|sub2\|up1\|up2\|all` if trunking is not enabled. Use `tsub\|tup\|all` if trunking is enabled. |

This command sets a Gigabit Ethernet interface(s) to not use VLAN trunking so the port only accepts frames with registered VIDs.

The following example sets the subtending 1Gigabit Ethernet interface to not use VLAN trunking.

```
ras>  switch port vlantrunk disable sub1
```

## 32.13 switch qschedule Commands

Use these commands to set a port's queuing method and/or priority weight.

### 32.13.1 switch qschedule set Command

Syntax:

```
switch qschedule set <giga-port> spq
```

or

```
<giga-port> wrr <wt0> <wt1> <wt2> <wt3> <wt4> <wt5> <wt6> <wt7>
```

where

| | | |
|---|---|---|
| `spq` | = | Strict Priority Queuing (SPQ) services queues based on priority only. When the highest priority queue empties, traffic on the next highest-priority queue begins. |
| `wrr` | = | Weighted Round Robin services queues based on their priority and queue weight. WRR is activated only when a port has more traffic than it can handle. |
| `<wt0> <wt1>`<br>`<wt2> <wt3>`<br>`<wt4> <wt5>`<br>`<wt6> <wt7>` | = | The priority weight for each queue, 0~15. |

This command sets a Gigabit Ethernet interface's queuing method and/or priority weight.

The following example sets the subtending interface 1 to use strict priority queuing.

```
ras>  switch qschedule set sub1 spq
```

### 32.13.2 switch qschedule show Command

Syntax:

```
switch qschedule show
```

This command shows the queuing methods and/or priority weights of the Gigabit Ethernet interfaces. This is an example.

```
ras> switch qschedule show
port  algo_type wt0 wt1 wt2 wt3 wt4 wt5 wt6 wt7
----- --------- --- --- --- --- --- --- --- ---
 sub1 spq         -   -   -   -   -   -   -   -
 sub2 spq         -   -   -   -   -   -   -   -
  up1 spq         -   -   -   -   -   -   -   -
  up2 spq         -   -   -   -   -   -   -   -
```

## 32.14 switch queuemap Commands

Use these commands to set the priorities of the individual queues.

### 32.14.1 switch queuemap set Command

Syntax:

```
switch queuemap set <priority> <queue>
```

where

<*priority*> = The IEEE 802.1p priority for each queue, 0~7.

<*queue*> = A physical queue in the system, 0~7.

This command sets the system to use a particular queue for traffic of a specific IEEE 802.1p priority.

The following example sets the system to use queue 3 for traffic with priority 3.

```
ras>  switch queuemap set 3 3
```

### 32.14.2 switch queuemap show Command

Syntax:

```
switch queuemap show
```

This command shows which queue the system uses for traffic of each priority. The following is an example.

```
ras> switch queuemap show
priority queue
-------- -----
       0     2
       1     0
       2     1
       3     3
       4     4
       5     5
       6     6
       7     7
ras>
```

# 33

# sys Commands

This chapter shows you how to use the sys commands.

## 33.1 sys Commands Overview

The sys commands are for system management and maintenance.

## 33.2 sys Commands Summary

The following table lists the sys commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 259** sys Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| sys | baud | set 9600\|19200\|38400\|57600\|115200 | | Sets the console port speed. | M |
| | | show | | Displays the console port speed. | L |
| | chsh | [engsh\|stdsh] | | Changes to normal or privileged command shell. | H |
| | client | disable | <*index*> | Turns off a secured client set. | M |
| | | enable | <*index*> | Turns on a secured client set. | M |
| | | set | <*index*> <*start-ip*> <*end-ip*> [telnet] [ftp] [web] [icmp] [ssh] [snmp] | Sets a group of trusted computers from which you can manage the switch. | M |
| | | show | | Displays the secured client sets. | L |
| | date | set | <*yyyy*> <*mm*> <*dd*> | Sets the system date. | M |
| | | show | | Displays the current system date. | L |
| | info | chassis | <*chassis*> | Sets the system chassis number (1~64). | M |
| | | contact | <*contact*> | Sets contact person information. | M |
| | | frame | <*frame*> | Sets the system frame number. | M |
| | | hostname | <*hostname*> | Sets the system name. | M |

**Table 259** sys Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | location | <*location*> | Sets the geographic location of the system. | M |
| | | show | | Displays general system and system information. | L |
| | monitor | set | <*slot*> <volt\|temp\|fan\|cpu\|mem\|pbuf> <*index*> <*high-limit*> <*low-limit*> | Sets hardware monitor alarm thresholds.<br>volt: Voltage<br>*index*: 1~5 (the number of voltage sensors varies by card)<br>temp: temperature<br>*index*: 1~3<br>fan: for system FAN,<br>*index*: 1~6 (the number of fans varies by chassis)<br>cpu: CPU<br>*index*: 1<br>mem: Memory<br>*index*: 1<br>pbuf: Packet buffer for transmission and receiving.<br>*index*: 1 | M |
| | | show | <*slot*> | Displays the hardware monitor threshold settings of a slot. | L |
| | multilogin | disable | | Turns off multiple concurrent logins. | M |
| | | enable | | Turns on multiple concurrent logins. | M |
| | | show | | Displays the multiple login setting. | L |
| | reboot | | | Restarts the system. | H |
| | | [show] | | Displays the reboot schedule. | H |
| | | <sec> | | Sets the number of seconds (1~2147483647) before the system reboots. If there is no time specified, the system reboots immediately. | H |
| | | [cancel] | | Aborts the scheduled system rebooting. | H |
| | server | enable | telnet\|ssh\|ftp\|web\|icmp\|snmp | Turns on service access to the switch. | M |
| | | disable | telnet\|ssh\|ftp\|web\|icmp\|snmp | Turns off service access to the switch. | M |
| | | port | telnet\|ftp\|web\|snmp\|ssh <*port*> | Sets a port for a service. | M |
| | | show | | Displays service access control settings. | L |
| | snmp | getcommunity | <*community*> | Sets the SNMP GetRequest community. | M |
| | | setcommunity | <*community*> | Sets the SNMP SetRequest community. | M |
| | | show | | Displays SNMP settings. | L |
| | | trapcommunity | <*community*> | Sets the SNMP Trap community. | M |

**Table 259** sys Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | trapdst | <*index*> <*destination*> [<*port*>] [v1\|v2c\|v3] [<*name*>] | Sets the IP addresses and listening ports for up to four SNMP trap server IP addresses and listening ports. Set 0.0.0.0 to not send any SNMP traps.<br>*name*: username to be included in trap packets. Only applicable for V3. | M |
| | | user | <*name*> noauth\|auth\|priv md5\|sha des\|aes | Sets SNMPv3 user name and security settings.<br>noauth: disables user authentication and data encryption.<br>auth: enables user authentication.<br>pri: enables user authentication and data encryption.<br>md5\|sha: authentication method.<br>des\|aes: encryption method. | M |
| | | version | v2c\|v3\|v3v2c | Sets the system to use the specified SNMP version and access.<br>v2c: SNMPv2 read/write<br>v3: SNMPv3 read/write<br>v3v2c: SNMPv3 read/write and SNMPv2 read-only. | M |
| | syslog | disable | | Turns off syslog logging. | M |
| | | enable | | Turns on syslog logging. | M |
| | | server | <*fac*> <*ip-address*> | Sets the log facility (local1~local7) to log the syslog messages to a specific file in the syslog server. See your syslog program's documentation for details. Sets the syslog server IP address. | M |
| | | show | | Displays the syslog settings. | L |
| | time | set | <*hh*> [<*mm*> [<*ss*>]] | Sets the system time. | M |
| | | show | | Displays the current system time. | L |
| | timeserver | set | none | Clears the time server settings. | M |
| | | | daytime <*ip-address*> [*sync*] or time\|ntp <*ip-address*> <utc[<+\|->0100~1200]> [sync] | Sets the time service protocol and IP address of a time server.<br>sync: Gets the time and date. | M |
| | | show | | Displays the time server settings. | L |
| | | sync | | Gets the time and date from a predefined time server. | M |
| | user | auth | <*mode*> | Selects which database the switch uses to authenticate a user. 1= local, 2 = radius, 3 = local then radius. | H |
| | | delete | <*name*> | Removes a user account. | H |
| | | disable | <*name*> | Stops a user from logging in. | H |
| | | enable | <*name*> | Allows a user to log in. | H |

**Table 259** sys Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | online | | Displays information about online users that are logged into the switch. * denotes your session. | L |
| | | server | <*ip-address*> <port> <*secret*> [high\|middle\|low\|deny] | Sets a RADIUS server's IP address and port number and the password to access the server.<br>low: assigns the login accounts a low privilege level if the received service type is "login".<br>medium: assigns the login accounts a medium privilege level if the received service type is "nas-prompt".<br>high: assign the login accounts a high privilege level if the received service type is "admin".<br>deny: block access from this login account if no service type is received. | H |
| | | set | <*username*> <*password*> high\|middle\|low | Sets a user account and its level of access privileges. | H |
| | | show | | Displays authentication settings and user accounts. | L |
| | version | | | Displays the system's general information such as the model name and firmware version. | L |

# 33.3 sys Commands

Use these commands for system management and maintenance.

## 33.3.1 sys version Command

Syntax:

```
sys version
```

This command displays general information about the system such as the model name and firmware version. This is an example.

```
ras> sys version

[master card version info]
product model   : MSC1000G
system up time  :    1:00:13:39
f/w version     : V3.70(LU.0) | 11/29/2006
bootbase version: VLU1.02 | 04/01/2005
database version : 09:16:57 2006/12/14
```

## 33.3.2 sys baud set Command

Syntax:

`sys baud set 9600|19200|38400|57600|115200`

This command sets the console port speed in bps.

The following example sets the console port speed to 115200 bps.

```
ras>  sys baud set 115200
```

## 33.3.3 sys baud show Command

Syntax:

`sys baud show`

This command displays the console port speed. This is an example.

```
ras> sys baud show
current baud rate is: 115200
ras>
```

## 33.3.4 sys client set Command

Syntax:

`sys client set <index> <start-ip> <end-ip> [telnet] [ftp] [web] [icmp] [ssh] [snmp]`

This command configures a secured client entry consisting of an IP address range of trusted computers that may manage the IES and the services that they can use.[5]

The following example creates a client set for IP addresses 192.138.1.7 to 192.168.1.35 to use FTP to manage the system.

```
ras> sys client set 1 192.168.1.7 192.168.1.35 ftp
```

## 33.3.5 sys client enable Command

Syntax:

`sys client enable <index>`

This command turns on a secured client set.

The following example turns on secured client set 1.

```
ras> sys client enable 1
```

5. Web-based management was not available at the time of writing.

## 33.3.6 sys client disable Command

Syntax:

`sys client disable <index>`

This command turns off a secured client set.

The following example turns off secured client set 1.

```
ras> sys client disable 1
```

## 33.3.7 sys client show Command

Syntax:

`sys client show`

This command displays the secured client settings. These are the IP addresses of trusted computers that can manage the system and the services that they can use.

An example is shown next. A “V” in a column means that the secured client set is activated or the services can be used for managing the system.

```
ras> sys client show

secured client:
idx enable start ip        end ip          telnet ftp web icmp ssh snmp
--- ------ --------------- --------------- ------ --- --- ---- --- ----
  1   yes  0.0.0.0         0.0.0.0            V    V   V    V   V    V
  2   no   0.0.0.0         0.0.0.0            -    -   -    -   -    -
  3   no   0.0.0.0         0.0.0.0            -    -   -    -   -    -
  4   no   0.0.0.0         0.0.0.0            -    -   -    -   -    -
ras>
```

## 33.3.8 sys time show Command

Syntax:

`sys time show`

This command displays the system’s current time. An example is shown next.

```
ras> sys time show
current time is 17:57:01
ras>
```

## 33.3.9 sys time set Command

Syntax:

`sys time set <hh> [<mm> [<ss>]]`

This command sets the system’s time. An example is shown next.

```
ras> sys time set 10 01 45
```

## 33.3.10 sys date show Command

Syntax:

```
sys date show
```

This command displays the system's current date. An example is shown next.

```
ras> sys date show
current date is Wed 2006/01/25
ras>
```

## 33.3.11 sys date set Command

Syntax:

```
sys date set <yyyy> <mm> <dd>
```

This command sets the system's date. An example is shown next.

```
ras> sys date set 2006 01 27
```

## 33.3.12 sys timeserver show Command

Syntax:

```
sys timeserver show
```

This command displays the system's time server settings. An example is shown next.

```
ras> sys timeserver show
protocol: none
server  : 0.0.0.0
timezone: utc
ras>
```

## 33.3.13 sys timeserver set Command

Syntax:

```
sys timeserver none
sys timeserver daytime <ip-address> [sync]
sys timeserver time|ntp <ip-address> <utc[<+|->0100~1200]> [sync]
```

where

| | | |
|---|---|---|
| `none` | = | Sets the system to not use a time server. |
| `daytime` | = | The Daytime time service protocol (RFC 867). When you select this format, the switch displays the day, month, year and time with no time zone adjustment. When you use this format it is recommended that you use a Daytime timeserver within your geographical time zone. |

| | | |
|---|---|---|
| time\|ntp | = | The time service protocol.<br>time: Time (RFC 868) format displays a 4-byte integer giving the total number of seconds since 1970/1/1 at 0:0:0.<br>ntp: NTP Network Time Protocol (RFC 1305) is similar to Time (RFC 868). |
| <*ip-address*> | = | The IP address of the time server. |
| <utc[<+\|-> 0100~1200]> | = | The time difference between UTC (Universal Time Coordinated, formerly known as GMT, Greenwich Mean Time) and your time zone. |
| [sync] | = | This sets the system to synchronize with the time server. |

This command sets the system to use a time server.

The following example sets the system to use NTP protocol to access a time server at IP address 140.112.2.189 and sets the system's time zone to eight hours ahead of UTC. It also has the system synchronize the time with the time server.

```
ras> sys timeserver set ntp 140.112.2.189 utc +0800 sync
sync with time server...success
ras>
```

## 33.3.14 sys timeserver sync Command

Syntax:

```
sys timeserver sync
```

This command has the system get the time and date from the time server. An example is shown next.

```
ras> sys timeserver sync
sync with time server...success
ras>
```

## 33.3.15 sys info chassis Command

Syntax:

```
sys info chassis <chassis>
```

where

| | | |
|---|---|---|
| <*chassis*> | = | The chassis number (an integer from 1 to 64). The chassis number helps to keep track of this individual unit in a multiple unit application. |

This command sets the system chassis number.

The following example sets the system's chassis number to 3.

```
ras> sys info chassis 3
```

## 33.3.16 sys info contact Command

Syntax:

`sys info contact <contact>`

where

`<contact>` = The name (up to 31 characters) and contact information of the person in charge of this device.

This command sets the system contact person information.

The following example sets Bob_ext1234 as the system's contact person information.

```
ras> sys info contact Bob_ext1234
```

## 33.3.17 sys info frame Command

Syntax:

`sys info frame <frame>`

where

`<frame>` = Number (an integer from 1 to 65535) of the frame (rack) where the system is installed.

This command sets the system's frame number.

The following example sets 12345 as the system's frame number.

```
ras> sys info frame 12345
```

## 33.3.18 sys info hostname Command

Syntax:

`sys info hostname <hostname>`

where

`<hostname>` = A descriptive name for identification purposes. This name can be up to 30 alphanumeric characters long.

This command sets the system name.

The following example sets "OurSystem" as the system's name.

```
ras> sys info hostname OurSystem
```

## 33.3.19 sys info location Command

Syntax:

```
sys info location <location>
```

where

*<location>* = The geographic location (up to 31 characters) of your device.

This command sets the geographic location of the system.

The following example sets Taiwan as the system's geographic location.

```
ras> sys info location Taiwan
```

## 33.3.20 sys info show Command

Syntax:

```
sys info show
```

This command shows general system information, such as the RAS code, firmware version, system uptime and bootbase version. An example is shown next.

```
ras> sys info show

[system info]
hostname        :
location        :
contact         :
frame           :
chassis         :

[master card version info]
product model   : MSC1000G
system up time  : 01:28:29
f/w version     : V3.70(AIN.0)b6 | 11/16/2006
bootbase version: VAIN(1.02) | 07/25/2006
database version : 18:28:38 2006/11/13ras>
```

## 33.3.21 sys monitor set Command

Syntax:

```
sys monitor set <slot> <volt|temp|fan|cpu|mem|pbuf> <index> <high-limit>
<low-limit>
```

where

| | | |
|---|---|---|
| <*slot*> | = | The main chassis slot where the card is located. Use the slot number of the MSC when you configure the fan, memory, or packet buffer limits. |
| volt\|temp\|fan\|cpu\|mem\|pbuf | = | volt: Set the voltage tolerance range.<br>temp: Set the temperature tolerance range.<br>fan: Set the rotations per minute (RPM) tolerance range for a fan.<br>cpu: Set the threshold for CPU usage.<br>mem: Set the threshold for memory usage.<br>pbuf: Set the threshold for usage of the packet buffer for transmission and receiving. |
| <*index*> | = | The index number of the sensor.<br>The power supply for each voltage has a sensor that is capable of detecting and reporting if the voltage falls out of the tolerance range. The card voltage sensors are as follows.<br>MSC1000G: 1 = 2.5 V, 2 = 1.25 V, 3 = 3.3 V, 4 = 1.3 V, 5 = 15 V<br>ADSL line card: 1 = 1.2 V, 2 = 1.8 V, 3 = 3.3 V, 4 = 20.5 V<br>SHDSL line card: 1 = 1.8 V, 2 = 3.3 V, 3 = 15.0 V<br>VDSL line card: 1 = 3.3 V, 2 = 12.0 V, 3 = 1.2 V, 4 = 1.2 V, 5 = 1.8 V<br>VoIP line card: 1 = 1.3 V, 2 = 2.5 V, 3 = 3.3 V, 4 = 3.3 V, 5 = 5.0 V<br>Ethernet line card: 1 = 2.5 V, 2 = 1.2 V, 3 = 3.3 V, 4 = 5.0 V<br>The management switch card has temperature sensors that are capable of detecting and reporting if the temperature rises above the threshold. Each card has three temperature sensors (1~3).<br>Each fan has a sensor that is capable of detecting and reporting if the fan speed falls below the threshold of 2000 RPM.<br>The system has six fans (1~6). |

| | | |
|---|---|---|
| *<high-limit>* | = | A sensor's maximum voltage, temperature, fan RPM, or utilization limit.<br>The maximum voltage for each voltage sensor must be within the following ranges. Measured in millivolts (mV).<br>MSC1000G: 1 = 2575~2750, 2 = 1287~1375, 3 = 3399~3630, 4 = 1339~1430, 5 = 15450~16500<br>ADSL line card: 1 = 1236~1320, 2 = 1854~1980, 3 = 3399~3630, 4 = 21115~22550<br>SHDSL line card 1 = 1854~1980, 2 = 3399~3630, 3 = 15450~16500<br>VDSL line card 1 = 3399~3630, 2 = 12360~13200, 3 = 1236~1320, 4 = 1236~1320, 5 = 1854~1980<br>VoIP line card 1 = 1339~1430, 2 = 2575~2750, 3 = 3399~3630, 4 = 3399~3630, 5 = 5150~5500<br>Ethernet line card 1 = 2575~2750, 2 = 1287~1375, 3 = 3399~3630, 4 = 5150~5500<br>The maximum temperature for each temperature sensor must be within 50~100 (degrees Celsius).<br>The maximum RPM for each fan must be within 1000~8000. |
| *<low-limit>* | = | A sensor's minimum voltage, temperature, fan RPM, or utilization limit.<br>The minimum voltage for each voltage sensor must be within the following ranges. Measured in millivolts (mV).<br>MSC1000G:1= 2250~2425, 2 = 1125~1212, 3 = 2970~3201, 4 = 1170~1261, 5 = 13500~14550.<br>ADSL line card: 1= 1080~1164, 2 = 1620~1746, 3 = 2970~3201, 4 = 18450~19885<br>SHDSL line card: 1 = 1620~1746, 2 = 2970~3201, 3 = 13500~14550<br>VDSL line card 1 = 2970~3201, 2 = 10800~11640, 3 = 1080~1164, 4 = 1080~1164, 5 = 1620~1746<br>VoIP line card 1 = 1170~1261, 2 = 2750~2425 3 = 2970~3201, 4 = 2970~3201, 5 = 4500~4850<br>Ethernet line card 1 = 2250~2425, 2 = 1080~1164, 3 = 970~3201, 4 = 4500~4850<br>The minimum temperature for each temperature sensor must be within -50~10 (degrees Celsius).<br>The minimum RPM for each fan must be within 1000~8000. |

This commands sets the hardware monitor high and low thresholds.

The following example sets fan 1's maximum RPM threshold to 7500 and minimum RPM threshold to 5000. The MSC1000G is in slot 2.

```
ras> sys monitor set 2 fan 1 7500 5000
```

## 33.3.22 sys monitor show command

Syntax:

`sys monitor show <slot>`

where

| | | |
|---|---|---|
| *<slot>* | = | The main chassis slot where the card is located. The fan statistics are included with the MSC1000G statistics. |

This command displays the hardware monitor's statistics.

The following example shows the MSC1000G statistics.

```
ras> sys monitor show 1
'*' indicates a current alarm
voltage:
idx  volt             current  nominal  high_lmt low_lmt
---  ---------------- -------- -------- -------- --------
  1  2.5V                2.571    2.500    2.700    2.300
  2  1.25V               1.242    1.250    1.350    1.150
  3  3.3V                3.334    3.300    3.564    3.036
  4  1.3V                1.334    1.300    1.404    1.196
  5  15V                14.999   15.000   16.200   13.800
temperature:
idx  temperature      current  high_lmt low_lmt
---  ---------------- -------- -------- --------
  1  Temp1               29.0     81.0    -10.0
  2  Temp2             30.750     82.0    -10.0
  3  Temp3             28.750     78.0    -10.0
fan:
idx  fan speed        current  high_lmt low_lmt
---  ---------------- -------- -------- --------
  1  FAN1                3337     7000     2000
  2  FAN2                3329     7000     2000
  3  FAN3                3306     7000     2000
  4  FAN4                3239     7000     2000
  5  FAN5                3335     7000     2000
  6  FAN6                3325     7000     2000
cpu:
idx  cpu              current  high_lmt
---  ---------------- -------- --------
  1  CPU1                  10       70
memory:
idx  memory           current  high_lmt
---  ---------------- -------- --------
  1  MEM1                  71       85
packet buffer:
idx  packet buffer    current  high_lmt
---  ---------------- -------- --------
  1  PKTBUFF1               0       71
```

## 33.3.23 sys multilogin enable Command

Syntax:

```
sys multilogin enable
```

This command turns on multiple login. Multiple login allows multiple administrators to be logged into the system at the same time. The following table describes how many sessions can be used at the same time.

**Table 260** Multiple Login Overview

| Console Port | SSH | Telnet | Web (HTTP) | FTP/SFTP | SNMP | ICMP |
|---|---|---|---|---|---|---|
| One session. | SSH and Telnet share four sessions. SSH has priority. Multiple users can login using the same user name and password. | | Three sessions (one session per user account) | One session | No limit | No limit |

The following is an example.

```
ras> sys multilogin enable
```

## 33.3.24 sys multilogin disable Command

Syntax:

```
sys multilogin disable
```

This command turns off multiple login. The following is an example.

```
ras> sys multilogin disable
```

## 33.3.25 sys multilogin show Command

Syntax:

```
sys multilogin show
```

This command displays the multiple login setting. The following is an example.

```
ras> sys multilogin show
multilogin is enabled
ras>
```

## 33.3.26 sys reboot Command

Syntax:

```
sys reboot [show] <sec> [cancel]
```

where

| | | |
|---|---|---|
| `[show]` | = | Displays the reboot schedule. |
| <*sec*> | = | The number of seconds (1~2147483647) before the system reboots. If there is no time specified, the system reboots immediately. |
| `[cancel]` | = | Aborts the scheduled system rebooting. |

This command restarts the system.

The following example shows the administrator at IP address 123.23.19.11 ordering a reboot to occur after 1200 seconds, displaying the reboot `schedule and then canceling the reboot`.

```
ras> sys reboot 1200

telnet-1(123.23.19.11) has initiated reboot, system reboot in 1200 seconds!

ras> sys reboot show

issued by                  remaining time issue time
-------------------------- -------------- ------------------------
telnet-1(123.23.19.11)               1196 Wed Jun  8 15:26:54 2005

ras> sys reboot cancel

telnet-1(123.23.19.11) has cancelled system reboot!
```

## 33.3.27 sys server port Command

Syntax:

`sys server port telnet|ftp|web|snmp|ssh <port>`

This command changes the port for a service on the system.

The following example sets the system to use port 24 for Telnet sessions.

```
ras> sys server port telnet 24
```

## 33.3.28 sys server disable Command

Syntax:

`sys server enable telnet|ftp|web|snmp|ssh`

This command turns off access for a service on the system.

The following example sets the system to block Telnet sessions.

```
ras> sys server disable telnet
```

## 33.3.29 sys server enable Command

Syntax:

`sys server enable telnet|ftp|web|snmp|ssh`

This command turns on access for a service on the system.

The following example sets the system to allow Telnet sessions.

```
ras> sys server enable telnet
```

### 33.3.30 sys server show Command

Syntax:

```
sys server show
```

This command displays the system's service access control settings. The following is an example.

```
ras> sys server show

server status  port
------ ------ -----
telnet   V       23
ftp      V       21
web      V       80
icmp     V       -
snmp     V      161
ssh      V       22
ras>
```

## 33.4 sys snmp Commands

Use these commands to configure the system's SNMP settings.

### 33.4.1 sys snmp getcommunity Command

Syntax:

```
sys snmp getcommunity <community>
```

where

<*community*> = The password for the incoming Get- and GetNext- requests from the management station.

Enter this command with the community to set the password.

The following example sets the password for incoming Get- and GetNext requests to "Get123".

```
ras> sys snmp getcommunity Get123
```

### 33.4.2 sys snmp setcommunity Command

Syntax:

```
sys snmp setcommunity <community>
```

where

<*community*> = The password for the incoming Set- requests from the management station.

Enter this command with the community to set the password.

The following example sets the password for incoming Set- requests to “Set123”.

```
ras> sys snmp setcommunity Set123
```

## 33.4.3 sys snmp trapcommunity Command

Syntax:

`sys snmp trapcommunity <`*`community`*`>`

where

| | | |
|---|---|---|
| <*community*> | = | The password sent with each trap to the SNMP manager. |

Enter this command with the community to set the password.

The following example sets the system to send a password of “public” with the traps it sends to the SNMP manager.

```
ras> sys snmp trapcommunity public
```

## 33.4.4 sys snmp trapdst Command

Syntax:

`sys snmp trapdst <index> <`*`ip-address`*`> [<`*`port`*`>] [v1|v2|v3] [<`*`name`*`>]`

where

| | | |
|---|---|---|
| <*index*> | = | The number of the trap server (1~4). |
| <*ip-address*> | = | The IP address of the trap server. |
| [<*port*>] | = | The port number upon which the trap server listens for SNMP traps. The system uses the default of 162 if you do not specify a trap port. |
| [v1\|v2c\|v3] | = | Format of the SNMP trap PDU (Protocol Data Unit) to be sent. The default is v2c. |
| [<*name*>] | = | The username to be included in the trap PDUs. This is only applicable for SNMPv3. |

Use this command to specify the IP address (and port number) of a trap server to which the system sends SNMP traps. If you leave the trap destination set to 0.0.0.0 (default), the system will not send any SNMP traps.

The following example sets the system to send traps to a server at IP address 192.168.1.36. The traps are sent using SNMP v3 and include the user name `example`.

```
ras> sys snmp trapdst 1 192.168.1.36 v3 example
```

## 33.4.5 sys snmp show Command

Syntax:

```
sys snmp show
```

This command displays the current SNMP get community, set community, trap community and trap destination settings. The following is an example.

```
ras> sys snmp show

[community]
get community : Get123
set community : Set123
trap community: public

[trap destination]
1: 192.168.1.36:162
2: 0.0.0.0:0
3: 0.0.0.0:0
4: 0.0.0.0:0
ras>
```

## 33.4.6 sys snmp user Command

Syntax:

```
sys snmp user <name> noauth|auth|priv md5|sha des|aes
```

where

| | | |
|---|---|---|
| <*name*> | = | User name for SNMPv3 authentication. |
| `noauth` | = | Disables (`noauth`) SNMPv3 user authentication and encryption for SNMP communication. |
| `auth` | = | Enables SNMPv3 user authentication. |
| `priv` | = | Enables SNMPv3 user authentication and encryption for SNMP communication using a private key generated from the password. |
| `md5\|sha` | = | Authentication method. MD5 (Message Digest 5) produces a 128-bit digest to authenticate packet data. SHA (Secure Hash Algorithm) produces a 160-bit digest to authenticate packet data.<br>Use `md5` for minimal security and `sha` for maximum security. |
| `des\|aes` | = | Encryption method. Data Encryption Standard (DES) is a widely used method of data encryption using a secret key. DES applies a 56-bit key to each 64-bit block of data.<br>Advanced Encryption Standard (AES) is a newer method of data encryption that also uses a secret key. AES is more secure than DES. |

This command sets the user authentication and data encryption settings for SNMPv3. The following example enables SNMPv3 SHA user authentication with AES data encryption.

```
ras> sys snmp user example auth sha aes
```

### 33.4.7 sys snmp version Command

Syntax:

```
sys snmp version v2c|v3|v3v2c
```

where

| | | |
|---|---|---|
| `v2c\|v3\|v3v2c` | = | Sets the SNMP version and access mode.<br>`v2c`: SNMPv2 read/write<br>`v3`: SNMPv3 read/write with additional user authentication and data encryption options.<br>`v3v2c`: SNMPv3 read/write and SNMPv2 read-only. |

This command sets the system to use the specified SNMP version and access mode.

The following example configures the system to use SNMPv3 with read-only access for SNMPv2.

```
ras> sys snmp version v3v2c
```

## 33.5 sys syslog Commands

Use these commands to configure the system's syslog settings.

### 33.5.1 sys syslog server Command

Syntax:

```
sys syslog server <fac> <ip-address>
```

where

| | | |
|---|---|---|
| *<fac>* | = | Sets the log facility (local1~local7) to log the syslog messages to a specific file in the syslog server. See your syslog program's documentation for details. Sets the syslog server IP address. |
| *<ip-address>* | = | The IP address of the syslog server. |

This command sets the syslog server's IP address and log facility.

The following example sets a syslog server log facility of 3 and IP address of 192.168.1.43.

```
ras> sys syslog server local3 192.168.1.43
```

### 33.5.2 sys syslog enable Command

Syntax:

```
sys syslog enable
```

This command sets the system to send logs to an external syslog server. An example is shown next.

```
ras> sys syslog enable
```

### 33.5.3 sys syslog disable Command

Syntax:

`sys syslog disable`

This command sets the system to not send logs to an external syslog server. An example is shown next.

```
ras> sys syslog disable
```

### 33.5.4 sys syslog show Command

Syntax:

`sys syslog show`

This command displays the syslog settings. An example is shown next.

```
ras> sys syslog show
status   : disabled
facility server ip
-------- ---------------
local1   0.0.0.0
local2   0.0.0.0
local3   192.168.1.43
local4   0.0.0.0
local5   0.0.0.0
local6   0.0.0.0
local7   0.0.0.0
ras>
```

## 33.6 sys user Commands

Use these commands to configure the system's administrator account and authentication settings.

### 33.6.1 sys user auth Command

Syntax:

`sys user auth <mode>`

where

| | | |
|---|---|---|
| <*mode*> | = | Sets which database the switch uses to authenticate a user.<br>4:tacacs+, 5:local then tacacs+<br>1: local<br>2: radius<br>3: local first and then radius<br>4: TACACS+<br>5: local first then TACACS+ |

This command sets which database the system uses to authenticate a user.

The following example sets the system to check a user's username and password against the local database.

```
ras> sys user auth 1
```

## 33.6.2 sys user server Command

Syntax:

`sys user server <ip-address> <port> <secret> [high|middle|low|deny]`

where

| | | |
|---|---|---|
| <*ip-address*> | = | The IP address of the RADIUS server. |
| <*port*> | = | The RADIUS server's listening port number.<br>The system uses the default of 1812 if you do not specify a port. |
| <*secret*> | = | The password for the RADIUS server. |
| `[high\|middle\|low\|deny]` | = | The default account privilege assignment if the RADIUS server does not send the service type information after user authentication is successful.<br>`low`: Assigns the login accounts a low privilege level.<br>`medium`: Assigns the login accounts a medium privilege level.<br>`high`: Assigns the login accounts a high privilege level.<br>`deny`: Blocks access from this login account. |

This command sets a RADIUS server's IP address, port number and the password to access the server. This command also sets the default account privilege assignment if the RADIUS server does not send the service type information after user authentication is successful.

You will be blocked access to the system for remote management if you enter `deny` and the system uses only RADIUS authentication with no system type information. In this case, you can only access and manage the device through the console port.

The following example sets a RADIUS server IP address of 192.168.1.77, port number of 1813 and password of “pwd1234”. The account is assigned a `medium` privilege if no service type information is received from the RADIUS server.

```
ras> sys user server 192.168.1.77 1813 pwd1234 medium
```

## 33.6.3 sys user set Command

Syntax:

`sys user set <username> <password> high|middle|low`

where

| | | |
|---|---|---|
| *<username>* | = | The user name for the account |
| *<password>* | = | The password for the account. |
| `high\|middle\|low` | = | The user account’s level of access privileges.<br>`high`: Can use all commands.<br>`middle`: Can use middle or low privilege commands. Middle privilege commands include things like general feature configuration.<br>`low`: Can only use low privilege commands. Low privilege commands are read only and consist of displaying feature settings or configuration. |

This command sets a local user administrator account and its level of access privileges.

The following example sets an administrator account with a user name of “bob” password of “smith” and middle level access privileges.

```
ras> sys user set bob smith middle
```

## 33.6.4 sys user delete Command

Syntax:

`sys user delete <name>`

where

| | | |
|---|---|---|
| *<name>* | = | The user name for the account. |

This command removes a local user administrator account.

The following example removes the “fred” administrator account.

```
ras> sys user delete fred
```

## 33.6.5 sys user enable Command

Syntax:

`sys user enable <name>`

where

<*name*> = The user name for the account

This command turns on an administrator account.

The following example turns on the “bob” administrator account.

```
ras> sys user enable bob
```

## 33.6.6 sys user disable Command

Syntax:

`sys user disable <name>`

where

<*name*> = The user name for the account

This command turns off an administrator account.

The following example turns off the “bob” administrator account.

```
ras> sys user disable bob
```

## 33.6.7 sys user show Command

Syntax:

`sys user show`

This command displays authentication settings and user accounts. The following is an example.

```
ras> sys user show
auth mode: local then radius
radius server ip: 0.0.0.0  port: 1812  secret: 1234
index en name             privilege
----- -- ---------------- ---------
    1 V  admin              high
ras>
```

## 33.6.8 sys user online Command

Syntax:

`sys user online`

This command displays information administrators that are logged into the switch.

The following is an example.  * denotes your session.

```
ras> sys user online
[session info ('*' denotes your session)]
session    user             remote ip       login time
---------- ---------------- --------------- -------------------
*telnet    admin            123.23.19.11    13:08:27 2005/06/09
ras>
```

# 34

# vlan Commands

This chapter shows you how to use the `vlan` commands.

## 34.1 vlan Commands Overview

The `vlan` commands are for static VLAN management.

## 34.2 vlan Commands Summary

The following table lists the `vlan` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 261** vlan Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `vlan` | `delete` | *<vid>* | | Removes a static VLAN. | M |
| | `disable` | *<vid>* | | Turns off a VLAN. | M |
| | `enable` | *<vid>* | | Turns on a VLAN. | M |
| | `name` | *<vid> <name>* | | Sets the name of a VLAN. | M |
| | `set` | *<vid> <giga-port>* `fix\|forbid\|normal tag\|untag` | | Adds a static VLAN. | M |
| | `show` | `[`*<vid>*`]\|[`*<start-vid> <end-vid>*`]` | | Displays all VLANs' settings, a specified VLAN's settings or a range of static VLANs' settings. | L |

## 34.3 vlan Commands

Use the `vlan` commands to configure static VLANs (SVLANs).

### 34.3.1 vlan delete Command

Syntax:

`vlan delete <vid>`

This command removes a static VLAN.

The following example removes static VLAN entry 27.

```
ras> vlan delete 27
```

## 34.3.2 vlan disable Command

Syntax:

`vlan disable <vid>`

This command turns off the static VLAN.

The following example turns off static VLAN entry 27.

```
ras> vlan disable 27
```

## 34.3.3 vlan enable Command

Syntax:

`vlan enable <vid>`

This command turns on the static VLAN.

The following example turns on static VLAN entry 27.

```
ras> vlan enable 27
```

## 34.3.4 vlan name Command

Syntax:

`vlan name <vid> <name>`

where

| | | |
|---|---|---|
| *<vid>* | = | The VLAN ID [1 – 4094]. |
| *<name>* | = | A name to identify the SVLAN entry. |

This command sets the name for an entry in the static VLAN table.

The following example names static VLAN entry 27 “sub1”.

```
ras> vlan name 27 sub1
```

## 34.3.5 vlan set Command

Syntax:

`vlan set <vid> <giga-port> <fix|forbid|normal> <tag|untag>`

where

| | | |
|---|---|---|
| <*vid*> | = | The VLAN ID [1 – 4094]. |
| <*giga-port*> | = | This represents Gigabit Ethernet uplink ports, subtending ports or all ports. Use `sub1\|sub2\|up1\|up2\|all` if trunking is not enabled. Use `sub\|up\|all` if trunking is enabled. |
| `fix\|forbid\|normal` | = | `fix`: Makes the port a permanent member of this VLAN group.<br>`forbid`: Prohibits the port from joining this VLAN group.<br>`normal`: The port can dynamically join this VLAN group using GVRP. This is available for the Ethernet ports.<br>You cannot change a port from the fixed state to another state if the port's PVID is set to this VLAN.<br>The VLAN must have at least one port set to the fixed status if the VLAN is the CPU (management) VLAN. |
| `tag\|untag` | = | `tag`: Add an IEEE 802.1Q tag to frames going out through this port(s).<br>`untag`: Send frames out through this port(s) without an IEEE 802.1Q tag. |

This command adds or modifies an entry in the static VLAN table.

The following example creates a static VLAN entry for VLAN 27 with the subtending 1 port as a fixed member and it tags all frames going out through the port.

```
ras> vlan set 27 sub1 fix tag
```

## 34.3.6 vlan show Command

Syntax:

`vlan show [<vid>]|[<start-vid> <end-vid>]`

where

| | | |
|---|---|---|
| `[<vid>]\|[<start-vid> <end-vid>]` | = | You can specify a single VID: <1>, or a range of VIDs: <6> <10>. |

This command shows information about the specified VLAN's settings. It displays the settings of all of the VLANs if you do not specify a VLAN.

The following example shows the settings for all VIDs.

```
ras> vlan show
 vid  uplink            1234567890 name
----- ----------------- ---------- --------------------------------
    1 FFFF/UUUU           XFXFFF F 1
   20 ----/TTTT           XXXXXX X 20
   30 ----/TTTT           XFXXXX X 30
```

# 35

# voip Commands

This chapter describes the Voice over IP management commands.

## 35.1 voip Commands Summary

The following table lists the `voip` commands. The **P** column on the right indicates the administrator privilege level needed to use the command (**H** for high, **M** for middle or **L** for low).

**Table 262** voip Commands

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| `voip` | `arp` | `flush` | *<slot>* | Delete all ARP entries in the specified slot. | M |
| | | `show` | *<slot>* | Display all ARP entries in the specified slot. | L |
| | `countrycode` | `set` | *<country>*\|*<countrycode>* | Set the country code for VoIP services. See the `countrycode set` example for a list of *<country>* and *<countrycode>* values:<br>Use the `lc lo` *<slot>* and `show` *countrycode* commands to see details of currently-configured country-specific attributes, such as impedance, codec type and ring parameters. | M |
| | | `show` | | Display the currently configured country code. | L |
| | `h248 mg` | `delete` | *<slot> <mg-name>* | Removes the specified MG. | M |
| | | `disable` | *<slot> <mg-name>* | Disables the specified MG. The MG is not visible to the MGC. | M |
| | | `enable` | *<slot> <mg-name>* | Enables the specified MG. | M |
| | | `map` | *<slot> <mg-name>* | Displays the settings of the specified MG. | L |

**Table 262** voip Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | set | *<slot> <mg-name> <h248-profile> [<mg-port>]* | Configures the MG port number of the specified slot with the specified H 248 profile.<br>*h248-profile*: H.248 profile name (<=32 characters)<br>*mg-port*: The MG port number (1025 ~ 65535).<br><br>Note: Each MG must use a different MG port. | M |
| | | show | *<mg-name>* | Displays MG-related information. | L |
| | sip dialplan | delete | *<name>* | Removes the specified dial plan table.<br>*name*: The dial plan table name (<32 characters). | M |
| | | map | [*<name>*] | Displays the SIP protocol profile(s) that refer to the specified dial plan table. | L |
| | | set | *<name> <pattern> <number-of-prefix-cut> <sip-server>* [*<prefix-add-digits> <number-of-digits> <interdigit-timeout>*] | Configures dialplan-related settings.<br>See Section 35.7.3 on page 750 for more information on this command. | M |
| | | show | [*<name>*] | Displays the contents of the specified dial plan table. | L |
| | sip localhelp | delete | *<name>* | Removes the specified local help table. | M |
| | | map | [*<name>*] | Displays the SIP call service profile(s) that refer(s) to the specified local help table.<br>*name*: The local help table name (<=32 characters). | L |
| | | set | *<name> <index>* [*<tel-number>*] | Configures the telephone number of the specified index in the specified local help table.<br>*name*: The emergency table name (<=32 characters).<br>*index*: The index number of an entry in the emergency table (1~16).<br>*tel-number*: The telephone number (<=16 digits). | M |
| | | show | [*<name>*] | Displays contents of the specified local help table.<br>*name*: The local help name (<=32 characters). | L |

**Table 262** voip Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | ip | set | <*slot*> <*ip-address*>[/<*netmask*>] <*vid*> | Sets the IP address and VLAN ID of the specified slot. | M |
| | | dns | <*slot*> <*dns-ip*> | Sets the DNS server IP address for the specified slot. | M |
| | | show | <*slot*> | Shows the IP address, VLAN ID and DNS server details for the specified slot. | L |
| | route | delete | <*slot*> default \|<*ip-address*>[/<*netmask*>] [*gateway*] | Removes the specified route entry of the specified slot. | M |
| | | set | <slot> default \|{<*ip-address*>[/<*netmask*>]} <*gateway-ip*> [<*metric*>] | Configures a routing entry for the specified slot. Each slot may have up to 16 routing entries.<br>*ip-address*: The route IP address.<br>*network mask*: 0 ~ 32 (default is 32)<br>*gateway-ip:* The gateway IP<br>*metric*: The metric number of the *route*: 1 ~ 15<br>*name*: The name of the route. | M |
| | | show | <*slot*> | Displays the routing table for the specified slot. | L |
| | sip numberplan | delete | <*name*> | Removes the specified numberplan table. | M |
| | | map | [<*name*>] | Displays the SIP call service profile(s) that refer to the specified numbering plan. | L |

**Table 262** voip Commands (continued)

| COMMAND | | | | DESCRIPTION | P |
|---|---|---|---|---|---|
| | | set | <*name*> <*index*> [<*pattern*> <*rule*>] | This command replaces the *pattern* (the dialed number) with the specified *rule*.<br>The system applies the rules in numerical order, from 1 ~ 16, so ordering is important.<br>*index*: The entry number (1 ~ 16) in the numberplan table.<br>*pattern*: The dialed number for which this rule applies.<br>Allowed characters are:<br>• Numerals “0” ~ “9”<br>• “x” (representing one digit)<br>• Asterisk “*” (representing one or more digits)<br>• Period “.” (representing zero or more repetitions of the digit or range preceding it, for example “5.” and “[1~3].”).<br>• Tilde “~” (representing a range of digits, for example “[3~9]”). The tilde must be used in brackets, and characters to either side of the tilde must both be digits.<br>• Comma”,” (representing a choice of digits. for example “[4,9]”). The comma must be used in brackets, and characters to either side of the comma must both be digits.<br>• Pipe “|”, separating number plan patterns.<br>• Brackets “[“ and “]” (representing an allowed range, for example “[1,3~5]”).<br>• A maximum of one pair of parentheses “(” and “)”<br>*rule*: The value with which the pattern is to be replaced:<br>“\c”: Countrycode.<br>“\d”: National destination (region) code/<br>“\1”: The numbers enclosed by the parentheses in the *pattern*.<br>“deny”: The *pattern* is not allowed. | M |
| | | show | [<*name*>] | Displays the entries in the specified numbering plan table. | L |

## 35.2 voip arp Commands

Use these commands to control ARP (Address Resolution Protocol) on the VoIP line cards.

### 35.2.1 voip arp flush Command

Syntax:

`voip arp flush <slot>`

This command removes all ARP (Address Resolution Protocol) table entries stored in the specified VoIP line card.

The following example deletes all ARP table entries from slot 4.

```
ras> voip arp flush 4
```

### 35.2.2 voip arp show Command

Syntax:

`voip arp show <slot>`

This command displays all ARP (Address Resolution Protocol) table entries stored in the specified VoIP line card.

The following example displays all ARP table entries in slot 4.

```
ras> voip arp show 4
slot ip mac timer
---- --------------- ----------------- -----
3 192.168.2.2 00:0f:ea:7b:cb:a1 280
3 192.168.2.4 00:0f:ea:79:01:c3 30
3 192.168.2.11 00:08:02:da:6b:97 270
3 192.168.2.20 00:0f:ea:79:01:d3 270
3 192.168.2.52 00:05:5d:96:ea:78 40
3 192.168.2.136 00:13:49:24:b0:78 300
3 192.168.2.159 00:13:49:24:b0:77 300
```

## 35.3 voip countrycode Commands

Use these commands to set the country of operation, or the country with the same configuration as the country of operation. The following lists the variables affected by the selected country code.

- AC impedance
- PCM companding law
- Cadence ring
- Flash time
- Pulse dial interval
- Pay-signal type

### 35.3.1 voip countrycode set Command

Syntax:

`ras> voip countrycode set <country>|<countrycode>`

where

| <country> | <countrycode> | <country> | <countrycode> |
|---|---|---|---|
| usa | 0 | uk | 22 |
| japan | 1 | germany | 23 |
| taiwan | 2 | greece | 24 |
| austria | 3 | australia | 25 |
| belgium | 4 | new zealand | 26 |
| bulgaria | 5 | hong kong | 27 |
| czech | 6 | singapore | 28 |
| denmark | 7 | morocco | 29 |
| finland | 8 | ireland | 30 |
| france | 9 | malaysia | 31 |
| hungary | 10 | russia | 32 |
| iceland | 11 | thailand | 33 |
| italy | 12 | israel | 34 |
| luxembourg | 13 | uae | 35 |
| netherlands | 14 | china | 36 |
| norway | 15 | ukraine | 37 |
| poland | 16 | south_africa | 38 |
| portugal | 17 | south_korea | 39 |
| slovakia | 18 | philippines | 40 |
| spain | 19 | india | 41 |
| sweden | 20 | turkey | 42 |
| switzerland | 21 | vietnam | 43 |
| | | brazil | 44 |

Use this command to configure regional settings for VoIP parameters. By default the VoIP line card is configured for use in the USA (countrycode 0).

The following example configures the VoIP line card for use in the Czech Republic.

```
ras> voip countrycode set 6
```

## 35.3.2 voip countrycode show Command

**Syntax**:

```
voip countrycode show
```

This command displays the PSTN parameters for which the VoIP line card is currently configured. An example is shown next.

```
ras> voip countrycode show
(country, countrycode) = (usa, 0)
law                       : ulaw
impedance                 : 600ohm
loop current              : 25 mA
tax type                  : metering

Ring parameters           :
frequency                 : 20 Hz
amplitude                 : 53 Vrms
onTime1                   : 2.00 seconds
offTime1                  : 4.00 seconds
onTime2                   : 2.00 seconds
offTime2                  : 4.00 seconds

Pulse parameters          :
flashMin                  : 90 ms
flashMax                  : 500 ms
breakMin                  : 47 ms
breakMax                  : 80 ms
makeMin                   : 30 ms
makeMax                   : 55 ms
interDigitMin             : 250 ms
Meter parameters          :
frequency                 : 12 kHz
onTime                    : 200 ms
offTime                   : 200 ms

    Press any key to continue, 'n' to nopause,'e' to exit
Caller Id parameters      :
CID type                  : during ring
Payload type              : mdmf
First TAS type            : NULL
Second TAS type           : NULL
first TAS interval        : 0 ms
second TAS interval       : 0 ms
start to ring             : 500 ms

Tones parameters:
dial tone                 : 350+440Hz -18.0dB continuous
ring back tone            : 440+480Hz -18.0dB on 2.000s off 4.000s
busy tone                 : 480+620Hz -18.0dB on 0.500s off 0.500s
congestion tone           : 480+620Hz -18.0dB on 0.300s off 0.200s
call waiting tone #1      : 2x(440Hz -18.0dB on 0.300s off 10.000s)
call waiting tone #2      : 2x(440Hz -18.0dB on 0.300s off 10.000s)
special dial tone         : 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone               : 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone              : 1400Hz -18.0dB on 0.500s off continuous
confirmation tone         : 3x(350+440Hz -18.0dB on 0.100s off 0.100s)
holding tone              : 440+480Hz -18.0dB on 0.500s off 0.500s
                            350+440Hz -18.0dB on 0.500s off 2.500s
```

# 35.4 voip h248 mg Commands

Use these commands to manage media gateways on the VoIP line cards.

## 35.4.1 voip h248 mg set Command

Syntax:

`voip h248 mg set <slot> <mg-name> <h248-profile> [<mg-port>]`
`where:`

`<h248-profile>` = The H.248 profile name (<=32 characters)

`<mg-port>` = The MG port number (1025 ~ 65535).

Use this command to set up a media gateway on a line card with the specified h248 profile.

The following example sets the VoIP line card in slot 4 to use media gateway named “mg1” on port 1025. The MG is assigned the h.248 profile “h248profile”.

```
ras> voip h248 mg set 4 mg1 h248profile
```

## 35.4.2 voip h248 mg enable Command

Syntax:

`voip h248 enable <slot> <mg-name>`

Use this command to enable the specified media gateway.

The following example enables the media gateway “mg1” on the line card in slot 4.

```
ras> voip h248 mg enable 4 mg1
```

## 35.4.3 voip h248 map Command

Syntax:

`voip h248 mg <slot> <mg-name>`

Use this command to display the settings of the specified MG.

The following example displays the settings of the media gateway on the VoIP line card in slot 4.

```
ras> voip h248 mg 4 mg1
MG name                         Termination Name
------------------------------- -------------------------------
DEFVAL                          term1
DEFVAL                          term2
```

### 35.4.4 voip h248 show Command

Syntax:

`voip h248 mg show <mg-name>`

Use this command to display MG-related information.

The following example displays media gateway settings on the line card in slot 4.

```
ras> voip h248 mg show 4
Mg Name(s):
---------------------
1. DEFVAL
2. mg1
```

### 35.4.5 voip h248 disable Command

Syntax:

`voip h248 disable <mg-name>`

Use this command to disable the media gateway on the specified VoIP line card. The MG is not visible to the MGC.

The following example disables the VoIP line card in slot 4.

```
ras> voip h248 disable 4 mg1
```

### 35.4.6 voip h248 delete Command

Syntax:

`voip h248 mg delete <slot> <mg-name>`

Use this command to remove a media gateway from the specified VoIP line card.

The following example removes a media gateway from the VoIP line card in slot 4.

```
ras> voip h248 mg delete 4 mg1
```

## 35.5 Voip ip Commands

Use these commands to manage the IP address, VLAN and DNS details of the VoIP line cards.

### 35.5.1 voip ip set Command

Syntax:

`voip ip set <slot> <ip-address>[/<netmask>] <vid>`

Use this command to configure the IP address, netmask and VLAN ID of the specified voIP line card.

The following example sets the VoIP line card in slot 4 to use the IP address 111.11.11.1 with a 24-bit subnet mask (255.255.255.0) and VLAN ID 22.

```
ras> voip ip set 4 111.11.11.1/24 22
```

### 35.5.2 voip ip dns Command

Syntax:

`voip ip dns <slot> <dns-ip>`

where

`<dns-ip>` = The IP address of the DNS server.

This command sets the DNS (Domain Name Service) server IP address for the specified VoIP line card.

The following example sets the VoIP line card in slot 4 to use the DNS server at 123.44.55.66.

```
ras> voip ip dns 4 123.44.55.66
```

### 35.5.3 voip ip show Command

Syntax:

`voip ip show <slot>`

This command shows the IP address, VLAN ID and DNS server IP address used by the specified VoIP line card.

The following example shows the information for the VoIP line card in slot 4.

```
ras> voip ip show 4
slot ip/mask            vid dns
==== ================== === ===============
   4 111.11.11.1    /24  22 123.44.55.66
```

## 35.6 voip route Commands

Use these commands to manage static routes for VoIP traffic.

### 35.6.1 voip route delete Command

Syntax:

`voip route delete <slot> default|<ip-address>[/<netmask>] [<gateway>]`

where

| | | |
|---|---|---|
| <*ip-address*> | = | The destination IP address of packets to which this static route applies. |
| <*netmask*> | = | The destination subnet mask of packets to which this static route applies. |
| <*gateway*> | = | The IP address of the gateway through which the packets are sent. |

This command removes a static, IP forwarding route for VoIP traffic.

The following example removes a static route for destination IP address 192.23.19.233 through a gateway at IP address 192.23.15.253 from slot 4.

```
ras> voip route delete 4 192.23.19.233 192.23.15.253
```

## 35.6.2 voip route set Command

Syntax:

`voip route set <slot> default|{<ip-address>[/<netmask>]} <gateway-ip> [<metric>]`

where

| | | |
|---|---|---|
| <*ip-address*> | = | The destination IP address of packets that this static route is to route. |
| <*netmask*> | = | The destination subnet mask of packets that this static route is to route. |
| <*gateway-ip*> | = | The IP address of the gateway that you want to send the packets through. |
| [<*metric*>] | = | The metric (hop count) of this static route. |

This command defines a new, static IP forwarding route for VoIP traffic on the specified slot, or edits an existing one.

The following example creates a static route to send VoIP traffic on slot 4 to destination IP address 192.23.19.233 through a gateway at IP address 192.23.15.253.

```
ras> voip route set 4 192.23.19.233 192.23.15.253 5
```

## 35.6.3 voip route show Command

Syntax:

`voip route show <slot>`

This command displays the routing table for the specified slot. An example is shown next.

```
ras> voip route show 4
ip/mask            gateway         metric
------------------ --------------- ------
192.23.15.0    /24 192.23.15.86         1
192.23.19.233  /32 192.23.15.253        5
192.168.1.0    /24 192.168.1.2          1
```

# 35.7 voip sip dialplan

Use these commands to configure the SIP server to which a call goes.

## 35.7.1 voip sip dialplan delete Command

**Syntax**:

`voip sip dialplan delete <name>`

where

<*name*> = The dial plan table name (<32 characters).

This command removes the specified dial plan table.

## 35.7.2 voip sip dialplan map Command

**Syntax**:

`voip sip dialplan map [<name>]`

This command displays settings for all SIP profiles configured on this line card, or settings for the SIP protocol profile(s) that refer to specified dial plan table. An example is shown next.

```
ras> voip sip dialplan map dialplan1
Dial plan profile(s) list that refer to "dialplan1" dial plan table:
name
--------------------------------
dialplan_profile

name : dialplan1
slot                       port
---- ------------------------------------------------------------------------
-
              1         2         3         4         5         6         7

12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
   3 ------------------------------------------------
   4 ------------------------------------------------
   5 ------------------------------------------------
   6 ------------------------
   7 ------------------------------------------------
   8
   9 ------------------------------------------------
  10 ------------------------------------------------------------------------
-
```

## 35.7.3 voip sip dialplan set Command

**Syntax**:

`voip sip dialplan set <name> <pattern> <number-of-prefix-cut> <sip-server> [<prefix-add-digits> <number-of-digits> <interdigit-timeout>]`

where

| | | |
|---|---|---|
| *<name>* | = | The dial plan table name (<32 characters). |
| *<pattern>* | = | The pattern of dialed digits to which this dialplan refers:<br>The pattern must be 64 characters or fewer in length. Allowed telephone characters are: digits 0~9, “*” and “#”.<br>Allowed function characters are: “x”, “.”, “|”, “!”, “~”, “,” and brackets “[ ]”.<br>“x” represents a single digit of any value (0~9). For example, the pattern “0800xxxxxx” represents any dialed number starting “0800” with six subsequent digits.<br>A period “.” represents zero or more repetitions of the character or range that precedes it. For example, “01.” represents “01” (zero repetitions), “011” (one repetition), “0111” (two repetitions) and so on; “[1~5].” represents any number of subsequent digits 1 to 5. “.” cannot be used in brackets (since brackets define possible values for a single digit).<br>A pipe “|” represents “or”. For example "1|2" means 1 or 2.<br>An exclamation mark “!” indicates that the preceding pattern is not allowed. For example, “900xxxxxx!” means that all dialed numbers beginning “900” with six subsequent digits are not allowed.<br>Brackets (“[”,“]”) are used when describing a permitted value for a single digit, for example “[0~5,7,9]”.<br>A tilde “~” is used within brackets to describe a range of possible values; for example, “[0~3]” represents 0,1,2, or 3. “~” is used in brackets only.<br>A comma “,” is used within brackets to separate possible values (an “or” function). For example, “[1,4,8]” represents 1, 4 or 8. |
| **<***number-of-prefix-cut*> | = | The number of digits to be removed from the beginning of the dialed number (0~8). |
| **<***sip-server***>** | = | The SIP profile name (<32 characters). |
| <*prefix-add-digits***>** | = | The digits to be inserted at the beginning of the dial number after the specified digits are first deleted (<=16 digits). |
| <*number-of-digits***>** | = | The number of permitted digits (1~15). This value is used when the final character of the pattern is “.”. |
| <*interdigit-timeout*> | = | **T**he maximum time in which a user can dial another digit. If the user does not dial another digit in this time, any dialplan that corresponds to the dialed number is applied. (1~10 seconds). |

This command configures dialplan-related settings. An example is shown next.

```
ras> voip sip dialplan set dialplan1 0033334444 2 SIPprofile1 "" 10 5
```

## 35.7.4 voip sip dialplan show Command

**Syntax**:

`voip sip dialplan show [<name>]`

This command displays the dial plans configured on this line card when no dialplan is specified, and the contents of a dial plan table when specified. An example is shown next.

```
ras> voip sip dialplan show
Dialplan Name(s):
---------------------
1. DEFVAL
2. dialplan1
ras> voip sip dialplan show dialplan1
dialplan name      : dialplan1
pattern            : 0033334444
num-of-prefix-cut  : 2
sip-server         : SIPprofile1
prefix-add-digits  :
number-of-digits   : 10
interdigit-timeout : 5
```

# 35.8 voip sip keypattern Commands

Use this screen to configure the key pattern feature in the VoIP line card. A key pattern profile is a set of telephone key-presses that allow users to access a variety of features such as call hold, call transfer, and so on.

## 35.8.1 voip sip keypattern set Command

Syntax:

`voip sip keypattern set <name> <service-type> <pattern>`

where

| | | |
|---|---|---|
| *<name>* | = | The name of the keypattern profile (<=32 characters). |
| *<service type>* | = | `callreturn \| calltransfer \| callwaitdisconn\| callwaitoff \| callwaiton \| callwaitonhold \| callwaitreject\|clir \| dndoff \| dndon \| callin` |
| *<pattern>* | = | The pattern describes the telephone keys a user presses to access a particular service. Use up to 7 characters including numerals 0~9, the pound (#) and asterisk (*). |

This command allows users to enable the “do not disturb” VoIP feature by pressing “#100”.

```
ras> voip sip keypattern set keypattern1 dndon #100
```

## 35.8.2 voip sip keypattern show Command

Syntax:

`voip sip keypattern show [name]`

where

| | | |
|---|---|---|
| [*name*] | = | The name of the keypattern profile (<=32 characters). |

If a keypattern profile is not specified, this commands lists configured keypattern profiles. When a profile is specified this command shows the settings of the specified profile, in this case the default keypattern profile “DEFVAL”.

```
ras> voip sip keypattern show
KeyPattern Name(s):
----------------------
1. DEFVAL
2. keypattern1
ras> voip sip keypattern show DEFVAL
KeyPattern Name : DEFVAL
service type          pattern
--------------- ----------------
callreturn       *97#
calltransfer     *98#
callwaitdisconn  1
callwaitoff      #43#
callwaiton       *43#
callwaitonhold   2
callwaitreject   0
clir             ##
dndoff           #99#
dndon            *99#
callin           #14
```

The following table describes the settings of a keypattern profile.

| | | |
|---|---|---|
| keyPattern name | | The name of the keypattern profile (<=32 characters). |
| service type | = | This describes the feature configured in this keypattern profile. |
| pattern | = | The pattern describes the telephone keys a user presses to access a particular service. Characters are limited to the numerals 0~9, the pound (#) and asterisk (*). |
| callreturn | = | Enter the sequence of keys the user presses to dial the phone number of the last incoming call (1~7 characters). |
| calltransfer | = | Enter the sequence of keys the user presses to enable a call transfer (1~7 characters). |
| callwaitdisconn | = | Enter the key the user presses to disconnect a current call and accept a waiting call (one character only). |
| callwaitoff | = | Enter the sequence of keys the user presses to turn call waiting off (1~7 characters). |
| callwaiton | = | Enter the sequence of keys the user presses to enable call waiting (1~7 characters). |
| callwaitonhold | = | Enter the key the user presses to place a current call on hold and accept a waiting call (one character only). |
| callwaitreject | = | Enter the key the user presses to reject a waiting call (one character only). |

| | | |
|---|---|---|
| `clir` | = | Enter the sequence of keys the user presses to restrict his/her phone number by not sending caller ID information (1~7 characters). |
| `dndoff` | = | Enter the sequence of keys the user presses to turn off Do Not Disturb (1~7 characters). |
| `dndon` | = | Enter the sequence of keys the user presses to turn on Do Not Disturb (1~7 characters). |
| `callin` | = | Enter the sequence of keys the user presses to turn on the Call In feature. When the Call In feature is active, the system limits call ringing time to ten seconds. |

# 35.9 voip sip localhelp Commands

Use these commands to manage the local help feature used by the VoIP line cards. Local help lets you configure which local subscribers are called instead of public emergency (or other) numbers in the event that the link to the VoIP provider is not available.

## 35.9.1 voip sip localhelp delete Command

Syntax:

`voip sip localhelp delete <`*`name`*`>`

where

<*name*> = The local help table name (<=32 characters).

This command removes the specified local help table. An example is shown to delete the local help table named “localhelp_table”.

```
ras> voip sip localhelp delete localhelp_table
```

## 35.9.2 voip sip localhelp map Command

Syntax:

`voip sip localhelp map [<`*`name`*`>]`

This command displays the SIP call service profile(s) that refer(s) to the specified local help table.

An example is shown using the local help table named “localhelp_table”.

```
ras> voip sip localhelp map localhelp_table
```

### 35.9.3 voip sip localhelp set Command

Syntax:

`voip sip localhelp set <name> <index> [<tel-number>]`
where

| | | |
|---|---|---|
| <*name*> | = | The local help table name (<=32 characters). |
| <*index*> | = | The index number of an entry in the emergency table (1~16). |
| <*tel-number*> | = | The telephone number entry (<=16 digits). |

This command configures the telephone number of the specified index in the specified local help table. An example is shown to delete the local help table named “localhelp_table”.

```
ras> voip sip localhelp set localhelp_table 1 33334444
```

### 35.9.4 voip sip localhelp show Command

Syntax:

`voip sip localhelp show [<name>]`

This command displays contents of the specified local help table. An example is shown to display the local help table named “local help_table”.

```
ras> voip sip localhelp show localhelp_table
localhelp name : localhelp_table
index tel-number
----- ----------------
1     33334444
2
```

## 35.10 voip sip numberplan Commands

Use these commands to manage the numbering plans used by the VoIP line cards. The numbering plans translate dialed numbers according to the rules you set.

### 35.10.1 voip sip numberplan delete Command

Syntax:

`voip sip numberplan delete <name>`

This command removes the specified SIP numbering plan table. An example is shown to delete the numbering plan table named “numplan_table”.

```
ras> voip sip numberplan delete numplan_table
```

## 35.10.2 voip sip numberplan map Command

Syntax:

`voip sip numberplan map [<name>]`

This command displays which SIP call service profiles refer to the specified SIP numbering plan table. An example is shown, displaying the SIP call service profiles that map to a numbering plan table named “numplan_table”.

```
ras> voip sip numberplan map numplan_table
index name
----- --------------------------------
1    . grilp
2    . sw
```

## 35.10.3 voip sip numberplan set Command

Syntax:

`voip sip numberplan set <name> <index> [<pattern> <rule>]`

where

`<index>` = The entry number (1 ~ 16) in the numberplan table.

`<pattern>` = The dialed number for which this rule applies.
Allowed characters are:

- Numerals “0” ~ “9”
- “x” (representing one digit)
- Asterisk “*” (representing one or more digits)
- Period “.” (representing zero or more repetitions of the digit or range preceding it, for example “5.” and “[1~3].”).
- Tilde “~” (representing a range of digits, for example “[3~9]”). The tilde must be used in brackets, and characters to either side of the tilde must both be digits.
- Comma”,” (representing a choice of digits. for example “[4,9]”). The comma must be used in brackets, and characters to either side of the comma must both be digits.
- Pipe “|”, separating number plan patterns.
- Brackets “[“ and “]” (representing an allowed range, for example “[1,3~5]”).
- A maximum of one pair of parentheses “(” and “)”

`<rule>` = The value with which the pattern is to be replaced.
“\c” = countrycode
“\d” = national destination (region) code
“\1” = the numbers enclosed by the parentheses in the `<pattern>`
“deny” = the `<pattern>` is not allowed.

This command replaces the `<pattern>` (the dialed number) with the specified `<rule>`. The VoIP line card applies the rules in numerical order, from 1 ~ 16, so ordering is important.

The following example shows a command defining a rule (number 1 in the numberplan “cx”) that replaces the dialed number “002(*)” with the numbers enclosed by the parentheses. In this example, a dialed number “0024401473123456” would be translated to “4401473123456”.

```
ras> voip sip numberplan set cx 1 002(*) \1
```

# 36

# Firmware and Configuration File Maintenance

This chapter tells you how to upload a new firmware file and how to upload and download configuration files.

## 36.1 Firmware and Configuration File Maintenance Overview

The system's built-in FTP (and SFTP) servers allow you to use any FTP (or SFTP) client (for example, ftp.exe in Windows) to upgrade card firmware or system configuration files. The firmware or configuration file upgrade is done during operation (run-time).

Do not interrupt the file transfer process, as it may permanently damage your system.

When you upload the MSC1000G's firmware, the MSC1000G automatically restarts when the upgrade process is complete.

## 36.2 Filename Conventions

The configuration file contains the whole system settings in the menus such as password, IP address, VLANs and so on. The configuration file is called "config.dat" when you obtain it from ZyXEL and "config-0" in the system.

ZyNOS (ZyXEL Network Operating System) is the system firmware. It has a "bin" filename extension when you get it from ZyXEL and is called "ras" in the system. With many FTP and SFTP clients, the filenames are similar to those shown next.

```
ftp> put firmware.bin ras
```

This is a sample from a FTP session to transfer the computer file `firmware.bin` to the MSC1000G.

```
ftp> get config-0 config.dat
```

This is a sample from a FTP session to transfer the MSC1000G's current configuration file (including the configuration files of all the line cards) to the computer file `config.dat`.

If your FTP or SFTP client does not allow you to have a destination filename different than the source, you will need to rename them as the MSC1000G only recognizes "config-0" and "ras". Be sure you keep unaltered copies of the files for later use.

The following table is a summary. Please note that the internal filename refers to the filename on the MSC1000G and the external filename refers to the filename not on the MSC1000G, that is, on your computer, local network or FTP site and so the name (but not the extension) may vary. After uploading new firmware, use the `sys version` command to confirm that you have uploaded the correct firmware version.

**Table 263** File Name Conventions

| FILE TYPE | INTERNAL NAME | EXTERNAL NAME | DESCRIPTION |
|---|---|---|---|
| Configuration File | config-0 | *.dat | This is the configuration filename for the MSC1000G. |
| Firmware | ras | *.bin | This is the generic name for the ZyNOS firmware on the MSC1000G. |

## 36.3 Editable Configuration File

The configuration file can be downloaded as a plain-text (English keyboard characters) file. Edits to the configuration can be made to this file before it is uploaded again to the IES.

You can change the ".dat" file to a ".txt" file and still upload it to the IES as long as you rename it to "config-0" when you upload it to the IES.

### 36.3.1 Editable Configuration File Backup

Configure your system, and then use FTP or SFTP to backup the plain-text configuration file onto your computer. Do the following to backup the configuration file:

Use an FTP or SFTP client to connect to the IES.

```
C:\> ftp <IES IP address>
```

Type your user name and press [ENTER].

```
User (123.23.15.86:(none)): admin
```

Enter the management password (1234 by default).

```
Password: 1234
230 Logged in
```

Use `get` to transfer the configuration file to the computer. The configuration file on the system (that you want to backup to the computer) is named `config-0`.

```
ftp> get config-0 config.dat
```

Quit FTP.

```
ftp> quit
```

## 36.3.2 Edit Configuration File

Open the `config.dat` file via a text editor (see the following example) and edit to the desired configuration.

Ensure that any changes you make to the commands in the configuration file correspond to the commands documented in this User's Guide. The system user password is encrypted and you cannot edit it in a text editor.

```
$$ system configuration file
[version]
1.00

$$ msc configuration
[confuser]
sys user auth 3
sys user set admin d4:88:dd:79:63:7c:78:11:87:92:cb:3b:c5:41:0c:21 high
sys user enable admin
sys user server 0.0.0.0 1812 1234
[confsyslog]
sys syslog disable
sys syslog server local1 0.0.0.0
sys syslog server local2 0.0.0.0
sys syslog server local3 0.0.0.0
sys syslog server local4 0.0.0.0
sys syslog server local5 0.0.0.0
sys syslog server local6 0.0.0.0
sys syslog server local7 0.0.0.0
[msc]
sys info hostname TGE1
sys snmp getcommunity public
sys snmp setcommunity public
sys snmp trapcommunity public
sys server port telnet 23
```

## 36.3.3 Editable Configuration File Upload

You can upload the configuration file by following the steps below.

Use an FTP or SFTP client to connect to the IES.

```
C:\> ftp <IES IP address>
```

Type your user name and press [ENTER].

```
User (123.23.15.86:(none)): admin
```

Enter the management password (1234 by default).

```
Password: 1234
230 Logged in
ftp> put xxx.dat config-0
```

Quit FTP.

```
ftp> quit
```

Wait for the update to finish. The system restarts automatically.

## 36.4 Firmware File Upgrade

Use the following procedure to upload firmware to the management switch card or DSL line card(s).

Use an FTP or SFTP client to connect to the management switch card.

```
C:\> ftp <IES IP address>
```

Type your user name and press [ENTER].

```
User (123.23.15.86:(none)): admin
```

Enter the management password (1234 by default).

```
Password: 1234
230 Logged in
```

Use the `ls` FTP command to list the files that you can work with on the IES. The following is an example. Use entries from the list to transfer the firmware file to the management switch card, line card or all the line cards of a certain model.

```
ftp> ls
200 Port command okay
150 Opening data connection for LIST
--w--w--w-   1 owner    group         3570592 Jul 01 12:00 ras
-rw-rw-rw-   1 owner    group           16106 Jul 01 12:00 config-0
-r--r--r--   1 owner    group           47813 Jul 01 12:00 almhis
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-ALC1248G-51
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-ALC1248G-53
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-SLC1248G-22
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-VLC1224G-41
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-ALC1272G-51
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-3
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-4
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-5
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-6
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-7
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-8
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-9
--w--w--w-   1 owner    group               0 Jul 01 12:00 fw-10
226 File sent OK
ftp: 1096 bytes received in 0.19Seconds 5.86Kbytes/sec.
```

In this example, the firmware file on your computer (that you want to put onto a card or cards) is named `firmware.bin`.

- Use this command to transfer the firmware file to the management switch card that you are using (the internal firmware file is named `ras`).

```
ftp> put firmware.bin ras
```

- Use this command to transfer the firmware file to a line card or the management switch card that you are not currently using. Use “fw-” followed by the number of the slot.

```
ftp> put firmware.bin fw-3
```

- Use this command to transfer the firmware file to all of the IES line cards of the same type. Use “fw-” followed by ALC1248G-51, ALC1248G-53, ALC1272G-51, SLC1248G-22, VLC1224G-41 or VOP1248G-61. The following example uploads firmware to all of the ALC1248G-51 line cards in the IES.

```
ftp> put firmware.bin fw-ALC1248G-51
```

## 36.5 Configuration File Upgrade

Use an FTP or SFTP client to connect to the IES.

```
C:\> ftp <IES IP address>
```

Type your user name and press [ENTER].

```
User (123.23.15.86:(none)): admin
```

Enter the management password (1234 by default).

```
Password: 1234
230 Logged in
```

Transfer the configuration file to the management switch card. The configuration file on your computer (that you want to put onto the management switch card) is named `config.dat`. The internal configuration file on the management switch card is named `config-0`.

```
ftp> put config.dat config-0
```

Quit FTP.

```
ftp> quit
```

Wait for the update to finish. The system restarts automatically.

# PART IV
# Troubleshooting and Product Specifications

Troubleshooting (767)
Product Specifications (775)

# 37

# Troubleshooting

This chapter offers some suggestions to solve problems you might encounter. The potential problems are divided into the following categories. See Chapter 38 on page 775 for default settings.

## 37.1 Power, Hardware Connections, and LEDs

The MSC1000G does not turn on. None of the LEDs turn on.

Make sure the MSC1000G is properly installed in the slot and the system power is properly connected and turned on.

Refer to the IES-5000 Series User's Guide for directions and safety warnings on installing the management switch card and power connections for the IES-5000.

The **ALM** LED is on.

An alarm has been detected on the MSC1000G, the Integrated Ethernet Switch fan or the **INPUT ALARM** terminals. Examples of an alarm on the MSC1000G are when the MSC1000G's voltage or temperature is outside of the normal range.

Check the logs to see the cause of the alarm. Take appropriate measures to remove the cause of the alarm. For example, you may need to change the fan module if the fans are not operating normally (see the IES-5000 Series User's Guide for directions).

One of the LEDs does not behave as expected.

1. Make sure you understand the normal behavior of the LED. See Section 2.2 on page 65.
2. Check the hardware connections. See Section 2.3 on page 66.
3. Inspect your cables for damage. Replace any damaged cables.
4. If the problem continues, contact the vendor.

### A Gigabit Ethernet interface's LEDs are not on.

1. Make sure the interface is enabled.
2. Make sure that the interface's connection speed is set to match that of the port on the peer Ethernet device.
3. Check the copper or fiber optic Ethernet cable and connections between the interface and the Ethernet switch or router.
4. If the interface is an SFP slot, check the transceiver.
5. Make sure that the peer Ethernet device is functioning properly.
6. If the Ethernet cable and peer Ethernet device are both OK and the LEDs stay off, there may be a problem with the interface. Contact the distributor.

### A SFP slot's **LNK** LED turns on and off intermittently.

1. Check the copper or fiber optic Ethernet cable and connections between the uplink or subtending interface and the Ethernet switch or router.
2. Make sure that the peer Ethernet device is functioning properly.
3. If the Ethernet cable and peer Ethernet device are both OK and the **LNK** LED keeps turning off and on, there may be a problem with the port. Contact the distributor.

## 37.2 MSC1000G Access and Login

### I forgot the IP address for the MSC1000G.

1. If you forgot the IP address of the in-band management port, try to log into the out-of-band management port. If you were using the out-of-band management port, try the in-band management port.
1. The default in-band IP address is **192.168.1.1**. The default out-of-band IP address is **192.168.0.1**.
2. Use the console port to log in to the MSC1000G.

## I forgot the password.

1. The default password is **1234**.
2. Contact customer support for how to reset your device to the factory defaults if you have forgotten the password.

## I cannot see or access the **Login** screen in the web configurator.

1. Make sure you are using the correct IP address.
   - The default in-band IP address is **192.168.1.1**. The default out-of-band IP address is **192.168.0.1**
   - If you changed the IP address, use the new IP address.
   - If you changed the IP address and have forgotten it, see the troubleshooting suggestions for I forgot the IP address for the MSC1000G.
2. Check the hardware connections, and make sure the LEDs are behaving as expected. See IES-5000 Series User's Guide and Chapter 2 on page 65.
3. Make sure your Internet browser does not block pop-up windows and has JavaScripts and Java enabled.
4. Make sure your computer is in the same subnet as the MSC1000G. (If you know that there are routers between your computer and the MSC1000G, skip this step.)
5. Reset the device to its factory defaults, and try to access the MSC1000G with the default IP address. See Section 37.7 on page 772.
6. If the problem continues, contact the network administrator or vendor, or try one of the following.

- Try to access the MSC1000G using another service, such as Telnet. If you can access the MSC1000G, use the `sys client show`, `sys user show`, and `sys server show` commands to find out why the MSC1000G does not respond to HTTP.
- If you are using in-band management, try connecting to the out-of-band management port or the console port.

## I can see the **Login** screen, but I cannot log in to the MSC1000G.

1. Make sure you have entered the user name and password correctly. The default user name is **admin**, and the default password is **1234**. These fields are case-sensitive, so make sure [Caps Lock] is not on.
2. If this does not work, you have to reset the device to its factory defaults. See Section 37.7 on page 772.

## I cannot use FTP to upload / download the configuration file. / I cannot use FTP to upload new firmware. (edit as needed)

See the troubleshooting suggestions for I cannot see or access the Login screen in the web configurator. Ignore the suggestions about your browser.

## The SNMP manager server cannot get information from the MSC1000G.

1. Ping the MSC1000G from the SNMP server. If you cannot, check the cable, connections and IP configuration.
2. Check to see that the community (or trusted host) in the MSC1000G matches the SNMP server's community.
3. Make sure that your computer's IP address matches a configured trusted host IP address (if configured).

## I cannot telnet into the MSC1000G.

1. Make sure that a telnet session(s) is not already operating. The MSC1000G only accepts one telnet session at a time (or a total of four Telnet and SSH sessions with multiple login enabled).
2. Make sure that your computer's IP address matches a configured secured client IP address (if configured). The MSC1000G immediately disconnects the telnet session if secured host IP addresses are configured and your computer's IP address does not match one of them.
3. Make sure that you have not disabled the Telnet service or changed the server port number that the MSC1000G uses for Telnet.
4. Ping the MSC1000G from your computer.
5. If you are able to ping the MSC1000G but are still unable to telnet, contact the distributor.
6. If you cannot ping the MSC1000G, check the cable, connections and IP configuration.
7. See the troubleshooting suggestions for I cannot see or access the Login screen in the web configurator. Ignore the suggestions about your browser.

## I cannot use the console port to access the MSC1000G.

Make sure you use terminal emulation software with the correct settings (default VT100 terminal emulation, 9600 bps, No parity, 8 data bits, 1 stop bit, and no flow control).

## 37.3 Data Transmission

The Gigabit Ethernet interface's LED is on, but data cannot be transmitted.

1. Make sure that the port has the appropriate uplink or subtending mode setting.
2. Make sure that the IP settings are properly configured.
3. Check the VLAN configuration.
4. Ping the MSC1000G from a computer behind the peer Ethernet device.
5. If you cannot ping, check the Ethernet cable and connections between the uplink or subtending port and the Ethernet switch or router.

## 37.4 Redundant Management Switch Cards

I cannot get a redundant (second) management switch card to work as a standby.

1. Make sure that the management switch cards are in slots 1 and 2 of the IES-5000 main chassis. The two management switch cards must have the same types of uplink and subtending connections.
2. Make sure that the management switch cards both have firmware version V3.50(LU.1) or later. Earlier firmware versions do not support the use of a redundant management switch card.

## 37.5 Management Lockout

You could lock yourself (and all others) out from the MSC1000G by:

1. Misconfiguring the text configuration file.
2. Forgetting the password.

Be careful not to lock yourself and others out of the MSC1000G.

## 37.6 A Line Card Does Not Become Active

A line card is stuck in the inactive state.

It is normal for a line card to be in the inactive state when it is starting up or the firmware is being upgraded. If neither of these is the case, the line card may be malfunctioning. Try the following.

1. The MSC1000G can automatically restart a line card that it is managing. If the line card is unresponsive, use the `lcman reset` command to perform a hardware reset on the line card.
2. Try removing the line card from the slot and re-installing it.
3. If neither of these steps work, use the `lcman disable` command. Then connect to the line card's console port and recover the firmware. The procedure to recover the line card firmware is similar to the procedure for recovering the MSC1000G firmware (see Section 37.7.2 on page 773).
4. After you have recovered the line card's firmware, use the `lcman enable` command to turn the MSC1000G's management of the line card back on.

## 37.7 Resetting the Defaults

You can upload the factory-default configuration file to reset the MSC1000G to the default settings. This means that you will lose all previous configurations and the speed of the console port will be reset to the default of 9600 bps with 8 data bit, no parity, one stop bit and flow control set to none. The user name and password will also be reset to "admin" and "1234". The default in-band IP address is 192.168.1.1. The default out-of-band IP address is 192.168.0.1.

If you forget your password or cannot access the MSC1000G, contact customer support for how to reset your device to the factory defaults.

### 37.7.1 Resetting the Defaults Via CLI Command

If you know the password, you can reload the factory-default configuration file via Command Line Interface (CLI) command. Use the following procedure.

1. Connect to the console port using a computer with terminal emulation software. See the chapter on hardware connections for details.
2. Enter your password.
3. Type `config default`.
4. Type `y` at the question "`reset configuration to factory default needs system restart! proceed(y/n)? >)?`"
5. After restarting, the MSC1000G is re-initialized with a default configuration file the default user name of "admin" and password of "1234".

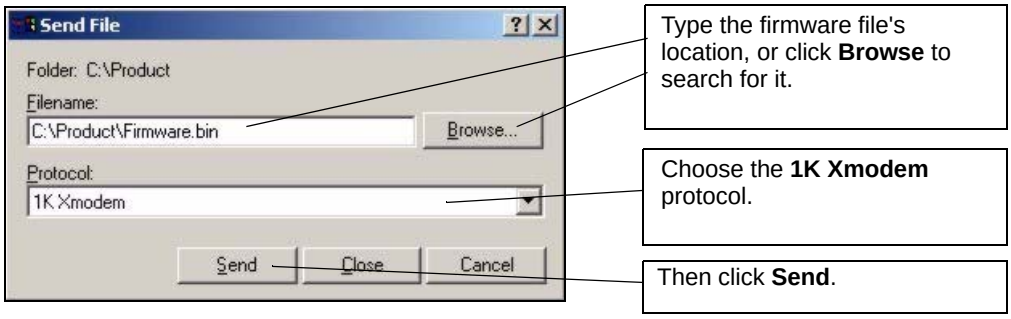
## 37.7.2 Recovering the Firmware

Usually you should use FTP or the console port to upload the MSC1000G's firmware. If the MSC1000G will not start up, the firmware may be lost or corrupted. Use the following procedure to upload firmware to the MSC1000G only when you are unable to use another method to upload firmware.

This procedure is for emergency situations only.

1. Obtain the firmware file, unzip it and save it in a folder on your computer.
2. Connect your computer to the console port and use terminal emulation software configured to the following parameters:
   - VT100 terminal emulation
   - No parity, 8 data bits, 1 stop bit
   - 9600 bps
   - No flow control
3. Turn off the IES-5000 and turn it back on to restart it and begin a session.
4. When you see the `Press any key to enter Debug Mode within 3 seconds` message, press a key to enter debug mode.
5. Type `atba5` after the `Enter Debug Mode` message (this changes the console port speed to 115200 bps).
6. Change the configuration of your terminal emulation software to use 115200 bps and reconnect to the MSC1000G.
7. Type `atur` after the `Enter Debug Mode` message.
8. Wait for the `Starting XMODEM upload` message before activating XMODEM upload on your terminal.
9. This is an example Xmodem configuration upload using HyperTerminal. Click **Transfer**, then **Send File** to display the following screen.

**Figure 271** Example Xmodem Upload




10. After a successful firmware upload, type `atgo` to restart the MSC1000G. The console port speed automatically changes back to 9600 bps when the MSC1000G restarts.

# 38

# Product Specifications

This appendix gives details about the IES-5000 default settings and MSC1000G hardware and features.

## 38.1 IES-5000 Default Settings

This table lists major default settings.

**Table 264** Default Settings

| | | |
|---|---|---|
| Default In-band IP Address | 192.168.1.1 | |
| Default In-band Subnet Mask | 255.255.255.0 (24 bits) | |
| Default Out-of-band IP Address | 192.168.0.1 | |
| Default Out-of-band Subnet Mask | 255.255.255.0 (24 bits) | |
| Default User Name | admin | |
| Default Password | 1234 | |
| Default Console Port Settings | VT100 terminal emulation, 9600 bps, No parity, 8 data bits, 1 stop bit, and no flow control | |
| **VLAN Default Settings**<br>One VLAN is created (this is also the management VLAN). | | |
| VID | 1 | |
| Registration | Fixed for the Ethernet and ADSL ports | |
| Tagging | Untagged for all ports | |
| **STP Default Settings** | | |
| Enable/Disable State | Disabled | |
| STP Version | MSTP | |
| Operational Mode: | auto | |
| **ADSL Profile Default Settings** | | |
| Name: | DEFVAL | |
| Latency Mode | Interleave | |
| | Upstream ADSL Settings: | Downstream ADSL Settings: |
| Maximum Rate | 1000 Kbps | 24000 Kbps |
| Minimum Rate | 32 Kbps | 64 Kbps |
| Interleave Delay | 20 ms | 20 ms |
| Maximum Signal to Noise Ratio | 31 db | 31 db |
| Minimum Signal to Noise Ratio | 6 db | 6 db |

**Table 264** Default Settings

| | | |
|---|---|---|
| Target Signal to Noise Ratio | 12 db | 12 db |
| Rate Adaptation Mode | Startup | Startup |
| Up Shift Margin | 15 db | 15 db |
| Down Shift Margin | 9 db | 9 db |
| **SHDSL Profile Default Settings** | | |
| Name: | DEFVAL | |
| Maximum Rate | 2304 Kbps | |
| Minimum Rate | 192 Kbps | |
| Annex Mode | annex b | |
| Wire Pair | 2wire | |
| Line Probe | disable | |
| **VDSL General Settings** | | |
| State | Disable | |
| Upstream Power Back-off | Off | |
| Frequency Plan | 998 | |
| VDSL Profile Plan | 12a | |
| RFI Band | Disable | |
| RFI Custom | Disable, all customized entries are 0~0 | |
| **VDSL Profile Default Settings** | | |
| Name: | DEFVAL | |
| Latency Mode | Interleave | |
| | Upstream Settings: | Downstream Settings: |
| Maximum Rate | 45440 kbps | 100032 kbps |
| Minimum Rate | 64 Kbps | 64 Kbps |
| Interleave Delay | 8 ms | 8 ms |
| Maximum Signal to Noise Ratio | 31 db | 31 db |
| Minimum Signal to Noise Ratio | 0 db | 0 db |
| Target Signal to Noise Ratio | 9 db | 9 db |
| Rate Adaptation Mode | Startup | Startup |
| Up Shift Margin | 15 db | 15 db |
| Down Shift Margin | 9 db | 9 db |
| **VoIP SIP Profile Default Settings** | | |
| Name | DEFVAL | |
| SIP server domain name | 0.0.0.0 | |
| SIP registrar server domain name | 0.0.0.0 | |
| SIP proxy server domain name | 0.0.0.0 | |
| SIP server port number: | 5060 | |
| SIP registrar server port number | 5060 | |
| SIP proxy server port number | 5060 | |

**Table 264** Default Settings

| | |
|---|---|
| URI type | SIP |
| IEEE 802.1p tag | 7 |
| DSCP tag | 48 |
| Keep alive | off |
| PRACK | off |
| **VoIP DSP Profile Default Settings** | |
| Name | DEFVAL |
| Codec | G.711a, G.711µ |
| Min-delay | 30ms |
| Max-delay | 120ms |
| Echo tail | 32ms |
| **VoIP SIP Call Service Profile** | |
| Name | DEFVAL |
| Password | none |
| Numbering plan | off |
| Call holding | on |
| Call waiting | on |
| Call transferring | on |
| CLIP | on |
| CLIR | on |
| DND | on |
| DTMF | bypass |
| fax | G.711 |
| Local call | off |
| **VoIP Default Regional Settings** | |
| Countrycode | USA (0) |
| **Default ATM Profile Settings** | |
| Name: | DEFVAL |
| Traffic Class: | UBR |
| PCR: | 300000 cell/sec. |
| CDVT: | 0 |
| **Virtual Channel Default Settings**[A] | |
| VPI: | 0 |
| VCI: | 33 |
| Multiplexing: | LLC-based |
| PVID: | 1 |
| Priority | 0 |

**Table 264** Default Settings

| | |
|---|---|
| ATM Profile: | DEFVAL |
| **Default IGMP Filter Profile Settings**<br>The **DEFVAL** IGMP filter profile is assigned to all of the ADSL ports by default. It allows a port to join all multicast IP addresses (224.0.0.0~239.255.255.255). | |

A. The ADSL ports' PVCs use ATM Adaptation Layer (AAL) 5. They also use RFC 1483 encapsulation.

# 38.2 Specifications

**Table 265** MSC1000G Specifications

| | |
|---|---|
| Dimensions | 267.4mm(w) x 231.0mm(D) x 37.55mm(H) |
| Device Weight | 1 Kg |
| Management Interfaces | In-band Ethernet management<br>One 100 Mbps Fast Ethernet RJ-45 port for out of band management<br>One RS-232 (DB-9 type) console port for local management |
| Power Specification | Power Rating: 1A MAX<br>Power Consumption: 20 W |
| Switching | Switching fabric capability: 24Gbps, non-blocking full duplex<br>Forwards IEEE 802.3, IEEE 802.1Q, Ethernet II frames<br>Prevents the forwarding of corrupted packets<br>Operates at L2 switch mode<br>Supports 16K MAC entries<br>Supports 4K VLAN entries |
| Standards Compliance | IEEE 802.1p, 802.1Q<br>IEEE 802.3u/3z/3x/3ab<br>SFF committee INF-8074i Specification SFP (Small Form factor Pluggable) transceiver rev.1.0 |
| Operating Environment | -40 ~ 65 degrees C<br>10% ~ 90% RH (non-condensing) |

**Table 265** MSC1000G Specifications

| | |
|---|---|
| Storage Environment | -40 ~ 70 degrees C<br>10% ~ 95% RH (non-condensing) |
| Certifications | CE Conformity<br>FCC<br>ITU-T K.20<br><br>Safety<br>IEC 60950-1<br>EN 60950-1<br>CSA 60950-1<br>UL 60950-1<br>NEBS Level 3<br><br>EMC<br>EN 300386<br>EN 55022<br>EN 61000-3-2<br>EN 61000-3-3<br>EN 55024<br>NEBS Level 3 |

## 38.3 Features

This section introduces the IES-5000 features.

**Table 266** IES-5000 Features

| | |
|---|---|
| Basic Function | Power-On System Test (POST)<br>LED display (SYS/ST/ALM)<br>Uplink Interface<br>Gigabit Ethernet<br>Thermal cutoff protection<br>Temperature and voltage monitoring and threshold setting |
| Management Interfaces | In-band Ethernet management<br>External alarm inputs interface<br>One 100 Mbps Fast Ethernet RJ-45 port for out of band management<br>One RS-232 (DB-9 type) console port for local management |

**Table 266** IES-5000 Features (continued)

| | |
|---|---|
| Management Features | Command Line Interface (CLI)<br>DSL profile function for managing DSL line card connections<br>Firmware upgrade through FTP or SFTP and serial console port<br>Telnet or SSH management (up to 4 concurrent sessions)<br>IEEE 802.1X port-based authentication<br>RADIUS client support for user's name and password<br>Text-based configuration file via FTP or SFTP<br>UNIX syslog<br>SSH version 2<br>SFTP (secure FTP)<br>NTP<br>IP ping and traceroute functions<br>SNMP<br>Firmware download<br>Database backup/restore<br>Fault and alarm management<br>Programmable alarm filters (threshold)<br>Configuration management<br>Performance counters<br>Performance statistics (15m/24h)<br>Access control<br>Event log<br>Internal trace and debug |
| Security Features | Detection of DOS attacks* |
| SNMP Management | SNMPv1/v2<br>SNMPv3 with optional SNMPv2c read-only<br>SNMP Trap v1/v2/v3<br>SNMP agent |
| MIBs | RFC1213 MIBII (system, interface, …)<br>ADSL line MIB<br>ADSL extension line MIB<br>SHDSL line MIB<br>Bridge MIB<br>Bridge MIB Extension<br>RMON MIB |
| VLAN | VLAN cross-connect<br>VLAN cross-connect: map DSL line (VPI/VCI) to one VLAN (maximum 4K VLAN)<br>Residential bridging: user to user traffic can be blocked<br>VLAN Tag-based<br>Transparent LAN Service (TLS) or Q-in-Q/VLAN stacking<br>Number of VLAN IDs: 4096<br>MAX number of VLAN + MAC per ADSL port: 256<br>UI Isolation<br>ADSL2/2+, SHDSL: accept untagged frame from CPE |

**Table 266** IES-5000 Features (continued)

| | |
|---|---|
| Quality of Service | IEEE 802.1p<br>IEEE 802.1p for QoS function at VLAN level<br>Minimum of priority queues<br>SPQ and WRR support for the queues<br>Mapping of priority to a queue by a configurable table<br>PVC default priority<br>DSCP-IEEE 802.1p mapping |
| Priority queuing | The priority queues are configurable based on the PVC: ATM QoS to IEEE 802.1p<br>priority mapping<br>The priority queues shall be configurable based on the PVC ATM service types<br>(UBR/ CBR /rt-VBR/nrt-VBR) to 802.1p priority mapping |
| Layer 2 Bridging | LLC and VC MUX bridging (RFC2684)<br>MAC address table: Up to 16K entries<br>MAC addresses per port: Up to 128<br>IEEE 802.1d transparent bridging<br>IEEE 802.1w rapid spanning tree protocol for network interface ports<br>Auto MAC address learning<br>MAC aging-out time<br>IEEE 802.1p priority queue mapping (static mapping)<br>Limiting number of MAC per port<br>Static MAC address filtering<br>Port Isolation (per system)<br>DHCP relay option 82 (globally, per VLAN)<br>Port-based VLAN tagging on subtending network interface port<br>Broadcast storm control |
| Multicast Features | IP multicast forwarding<br>IGMP Proxy<br>IGMP snooping<br>v1&v2 (port based)<br>VLAN-aware IGMP snooping<br>IGMP multicast channel limiting by group count or bandwidth usage<br>Static multicast addresses 128<br>Broadcast methodology<br>IGMP membership reports<br>All video group address are configured in the system<br>Tracking MAC address with IGMP<br>Multicast VLAN (16 VLANs) |
| ACL/Filtering | L2 frame filtering, such as based on source MAC address, port etc.<br>PPPoE filtering<br>Layer 3 filtering based on IP header: source addresses, destination addresses,<br>protocol ID, UDP/TCP port number<br>ARP broadcast filtering<br>NetBIOS filtering<br>DHCP broadcast filtering<br>IGMP filtering<br>Rate limiting<br>Rate limiting per XDSL port<br>Rate limiting per XDSL VC<br>Rate limiting per Ethernet port (MSC1000G ports in subtending mode) |

**Table 266** IES-5000 Features (continued)

| | |
|---|---|
| Per DSL Port Provisioning | Per port limitations:<br>Number of ACL Profile: 8<br>Number of DHCP snooping table entries: 32<br>Number of static DHCP snooping table entries: 3<br>Number of MAC filters: 10<br>Number of MVLAN: 4<br>Number of OUI Filter: 10<br>Number of PVCs (PVC, PPVC member, TLS PVC, PAEPVC): 8<br>Number of PPVCs: 2<br>Number of VLANs: 16 |
| System-wide Provisioning | Number of VLANs: 4094<br>ADSL profiles: 128<br>SHDSL profiles: 128<br>ATM profiles: 128<br>IGMP filter profiles: 128<br>ALARMADSL profiles: 128<br>ALARMSHDSL profiles: 128<br>DHCP relay servers: 32<br>IP routes: 16<br>Static multicast addresses: 128<br>MAC filters: 512<br>MVLAN: 16<br>Multicast groups per MVLAN: 16<br>Multicast bandwidth control groups: 96<br>IGMP groups: 16 VLANs, 256 groups per linecard<br>User (administrator) accounts: 16 |

**Table 267** Supported Standards

| STANDARD | DESCRIPTION |
|---|---|
| RFC 867<br>RFC 868<br>RFC 1305 | Daytime protocol<br>Time protocol<br>Network Time Protocol (NTP) |
| RFC 1112<br>RFC 2236<br>RFC 3376 | Internet Group Multicast Protocol (IGMP) |
| RFC 1213<br>RFC 1573<br>RFC 1757<br>RFC 2662<br>RFC 2665<br>RFC 2674<br>RFC 2863<br>RFC 3440<br>RFC 3635<br>RFC 3636 | Simple Network Management Protocol (SNMP) |
| RFC 1483 | Multiprotocol Encapsulation over ATM Adaptation Layer 5 |
| RFC 2131<br>RFC 2132<br>RFC 3046 | Dynamic Host Configuration Protocol (DHCP) |

**Table 267** Supported Standards (continued)

| STANDARD | DESCRIPTION |
|---|---|
| RFC 2138<br>RFC 2139 | Remote Authentication Dial In User Service (RADIUS) |
| RFC 2486 | Extensible Authentication Protocol (EAP) |
| RFC 2684 | LLC and VC MUX Bridging |
| IEEE 802.1D<br>IEEE 802.1w<br>IEEE 802.1s | Spanning Tree Protocol (STP)<br>Rapid Spanning Tree Protocol (STP)<br>Multiple Spanning Tree Protocol (MSTP) |
| IEEE 802.1d | Transparent Bridging |
| IEEE 802.1p | Layer 2 Traffic Prioritization |
| IEEE 802.1Q | Virtual Local Area Network (VLAN) |
| IEEE 802.1x | Network Authentication |
| IEEE 802.3ab | 1000Base-T |
| IEEE 802.3ad | Link Aggregate Control Protocol (LACP) |
| IEEE 802.3u | 100Base-T |
| IEEE 802.3x | Flow Control, Fast Ethernet |
| IEEE 802.3z | 1000Base-X |
| ANSI T1.413 issue 2 | ADSL Operational Mode |

## 38.4 Firmware Naming Conventions

A firmware version includes the model code and release number as shown in the following example.

Firmware Version: V3.70(LU.0)

"LU" is the model code.

"0" is this firmware's release number. This varies as new firmware is released. Your firmware's release number may not match what is displayed in this User's Guide.

## 38.5 Console Port Pin Assignments

In a serial communications connection, generally a computer is DTE (Data Terminal Equipment) and a modem is DCE (Data Circuit-terminating Equipment). The MSC1000G is DCE when you connect a computer to the console port.

**Figure 272** Console Port Pin Layout

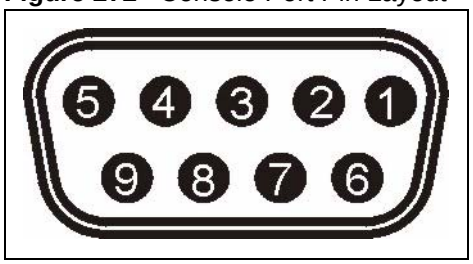



**Table 268** Console Port Pin Assignments

| CONSOLE PORT RS – 232 (FEMALE) DB-9F |
|---|
| Pin 1 = NON<br>Pin 2 = DCE-TXD<br>Pin 3 = DCE –RXD<br>Pin 4 = DCE –DSR<br>Pin 5 = GND<br>Pin 6 = DCE –DTR<br>Pin 7 = DCE –CTS<br>Pin 8 = DCE –RTS<br>PIN 9 = NON |
| The CON/AUX port also has these pin assignments. The CON/AUX switch changes the setting in the firmware only and does not change the CON/AUX port's pin assignments. |

## 38.6 ALARM Connector Pin Assignments

The ALARM connector is a DB15F connector.

**Figure 273** ALARM Connector Pin Layout

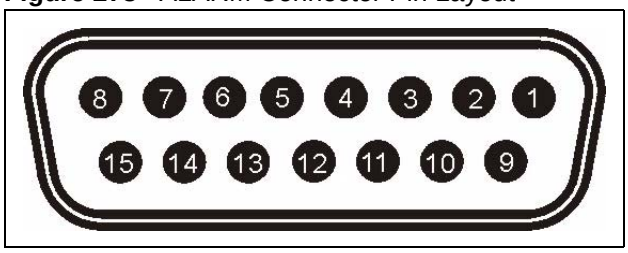



**Table 269** ALARM Connector Pin Assignments

| PIN | DESCRIPTION |
|---|---|
| 1 | Common pin for alarm input 1 |
| 2 | Common pin for alarm input 2 |
| 3 | Common pin for alarm input 3 |
| 4 | Normal close for minor alarm output |
| 5 | Normal open for minor alarm output |
| 6 | Common pin for major alarm output |
| 7 | Normal close for critical alarm output |

**Table 269** ALARM Connector Pin Assignments

| PIN | DESCRIPTION |
|---|---|
| 8 | Normal open for critical alarm output |
| 9 | Normal close for alarm input 1 |
| 10 | Normal close for alarm input 2 |
| 11 | Normal close for alarm input 3 |
| 12 | Common pin for minor alarm output |
| 13 | Normal close for major alarm output |
| 14 | Normal open for major alarm output |
| 15 | Common contact for critical alarm output |

# PART V
# Appendices and Index

Legal Information (861)
Customer Support (865)
Index (871)

# A

# PSTN Parameters by Country

## USA

Country Code: 0,usa
law: ulaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 2.00 seconds
offTime1: 4.00 seconds
onTime2: 2.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: during ring
payload type: MDMF
first TAS type: NULL
second TAS type: NULL
first TAS interval: 0 ms
second TAS interval: 0 ms
start to ring: 500 ms (prior ring only)

Tones parameters:
dial tone: 350+440Hz -18.0dB continuous
ring back tone: 440+480Hz -18.0dB on 2.000s off 4.000s
busy tone: 480+620Hz -18.0dB on 0.500s off 0.500s
congestion tone: 480+620Hz -18.0dB on 0.300s off 0.200s
call waiting tone #1: 2x(440Hz -18.0dB on 0.300s off 10.000s)
call waiting tone #2:: 2x(440Hz -18.0dB on 0.300s off 10.000s)
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 3x(350+440Hz -18.0dB on 0.100s off 0.100s)
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s; 350+440Hz -18.0dB on 0.500s off 2.500s

## Japan

Country Code: 1,japan
law: ulaw
impedance: 600ohm_1000nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds

offTime1: 2.00 seconds
onTime2: 1.00 seconds
offTime2: 2.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 620 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: during ring
payload type: MDMF
first TAS type: NULL
second TAS type: NULL
first TAS interval: 0 ms
second TAS interval: 0 ms
start to ring: 500 ms (prior ring only)

Tones parameters:
dial tone: 400Hz -18.0dB continuous
ring back tone: 400Hz -18.0dB on 1.000s off 2.000s
busy tone: 400Hz -18.0dB on 0.500s off 0.500s
congestion tone: 400Hz -18.0dB on 0.500s off 0.500s
call waiting tone #1: 400Hz -18.0dB on 0.500s off 2.000s
call waiting tone #2: 400Hz -18.0dB on 0.100s off 0.100s
400Hz -18.0dB on 0.100s off 3.000s
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s

howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 400Hz -18.0dB on 0.125s off 0.125s
400Hz -18.0dB on 0.125s off 0.625s
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Taiwan

Country Code: 2,taiwan
law: ulaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 2.00 seconds
onTime2: 1.00 seconds
offTime2: 2.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 350+440Hz -13.0dB continuous
ring back tone: 440+480Hz -19.0dB on 1.000s off 2.000s
busy tone: 480+620Hz -24.0dB on 0.500s off 0.500s
congestion tone: 480+620Hz -24.0dB on 0.250s off 0.250s
call waiting tone #1: 1x(440+480Hz -13.0dB on 1.500s)
call waiting tone #2: 350+440Hz -13.0dB on 0.250s off 0.250s
350+440Hz -13.0dB on 0.250s off 5.250s
special dial tone: 3x(350+440Hz -13.0dB on 0.100s off 0.100s)
350+440Hz -13.0dB continuous
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 2x(392Hz -17.0dB on 0.500s
494Hz -17.0dB on 0.500s
587Hz -17.0dB on 1.500s)
confirmation tone: 1x(350+440Hz -13.0dB on 0.100s off 0.100s
350+440Hz -13.0dB on 0.300s)
holding tone: 440+480Hz -13.0dB on 0.500s off 0.500s
350+440Hz -13.0dB on 0.500s off 2.500s

## Austria

Country Code: 3,austria
law: alaw
impedance: 220ohm_820ohm_120nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 50.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 5.00 seconds
onTime2: 1.00 seconds
offTime2: 5.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 420Hz -18.0dB continuous
ring back tone: 420Hz -18.0dB on 1.000s off 5.000s
busy tone: 420Hz -18.0dB on 0.400s off 0.400s

congestion tone: 420Hz -18.0dB on 0.200s off 0.200s
call waiting tone #1: 420Hz -18.0dB on 0.040s off 1.950s
call waiting tone #2: 420Hz -18.0dB on 0.040s off 1.950s
special dial tone: 380+420Hz -18.0dB continuous
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 420Hz -18.0dB on 0.150s off 0.150s
420Hz -18.0dB on 0.150s off 1.950s
confirmation tone: 380+420Hz -18.0dB on 1.000s off 5.000s
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Belgium

Country Code: 4,belgium
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 3.00 seconds
onTime2: 1.00 seconds
offTime2: 3.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 3.000s
busy tone: 425Hz -18.0dB on 0.500s off 0.500s
congestion tone: 425Hz -18.0dB on 0.167s off 0.167s
call waiting tone #1: 1400Hz -18.0dB on 0.175s off 0.175s
1400Hz -18.0dB on 0.175s off 3.500s
call waiting tone #2: 1400Hz -18.0dB on 0.175s off 0.175s
1400Hz -18.0dB on 0.175s off 3.500s
special dial tone: 425Hz -18.0dB on 1.000s off 0.250s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 1400Hz -18.0dB on 0.400s off 15.000s

## Bulgaria

Country Code: 5,bulgaria
law: alaw
impedance: 220ohm_820ohm_120nf

loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 2.00 seconds
offTime1: 4.00 seconds
onTime2: 2.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous

ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.500s off 0.500s
congestion tone: 425Hz -18.0dB on 0.250s off 0.250s
call waiting tone #1: 425Hz -18.0dB on 0.150s off 0.150s
425Hz -18.0dB on 0.150s off 4.000s
call waiting tone #2: 2x(425Hz -18.0dB on 0.300s off 9.700s)
special dial tone: 425Hz -18.0dB on 1.500s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 425Hz -18.0dB on 0.350s off 0.500s
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 950Hz -18.0dB on 0.650s off 0.320s
950Hz -18.0dB on 0.320s off 0.320s
1400Hz -18.0dB on 1.300s off 2.600s

## Czech Republic

Country Code: 6,czech
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms

breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB on 0.330s off 0.330s
425Hz -18.0dB on 0.660s off 0.660s
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.330s off 0.330s
congestion tone: 425Hz -18.0dB on 0.165s off 0.165s
call waiting tone #1: 425Hz -18.0dB on 0.330s off 9.000s
call waiting tone #2: 425Hz -18.0dB on 0.330s off 9.000s
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

# Denmark

Country Code: 7,denmark
law: alaw
impedance: 300ohm_1000ohm_220nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 0.75 seconds
offTime1: 7.50 seconds
onTime2: 0.75 seconds
offTime2: 7.50 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: DTMF
first TAS type: line reversal
second TAS type: NULL
first TAS interval: 300 ms

second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.250s off 0.250s
congestion tone: 425Hz -18.0dB on 0.250s off 0.250s
call waiting tone #1: 425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s off 3.600s
425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s
call waiting tone #2: 425Hz -18.0dB on 0.200s off 0.600s
425Hz -18.0dB on 0.200s off 3.000s
425Hz -18.0dB on 0.200s off 0.600s
425Hz -18.0dB on 0.200s
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Finland

Country Code: 8,finland
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms

onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.300s off 0.300s
congestion tone: 425Hz -18.0dB on 0.200s off 0.200s
call waiting tone #1: 425Hz -18.0dB on 0.150s off 0.150s
425Hz -18.0dB on 0.150s off 8.000s
call waiting tone #2: 425Hz -18.0dB on 0.150s off 0.150s

425Hz -18.0dB on 0.150s off 8.000s
special dial tone: 425Hz -18.0dB on 0.650s off 0.025s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 425Hz -18.0dB on 0.200s off 0.300s
425Hz -18.0dB on 0.200s off 1.300s
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## France

Country Code: 9,france
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 50.0 Hz
amplitude: 68.0 Vrms
onTime1: 1.65 seconds
offTime1: 3.35 seconds
onTime2: 1.65 seconds
offTime2: 3.35 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: RP-AS
second TAS type: NULL
first TAS interval: 650 ms
second TAS interval: 0 ms
start to ring: 350 ms (prior ring only)

Tones parameters:
dial tone: 440Hz -18.0dB continuous
ring back tone: 440Hz -18.0dB on 1.500s off 3.500s
busy tone: 440Hz -18.0dB on 0.500s off 0.500s
congestion tone: 440Hz -18.0dB on 0.500s off 0.500s
call waiting tone #1: 440Hz -18.0dB on 0.300s off 10.000s
call waiting tone #2: 440Hz -13.0dB on 0.300s off continuous
special dial tone: 350+440Hz -13.0dB on 0.100s off 0.100s
howler tone: 480Hz 3.0dB continuous
warning tone: 480+620Hz -24.0dB on 0.250s off 0.250s
480+620Hz -24.0dB on 0.250s off continuous
confirmation tone: 600Hz -24.0dB on 0.125s off 0.125s
600Hz -24.0dB on 0.125s off continuous
holding tone: 440Hz -13.0dB on 0.300s off continuous

## Hungary

Country Code: 10,hungary
law: alaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 66.0 Vrms
onTime1: 1.20 seconds
offTime1: 3.70 seconds
onTime2: 1.20 seconds
offTime2: 3.70 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.250s off 3.750s
busy tone: 425Hz -18.0dB on 0.300s off 0.300s

congestion tone: 425Hz -18.0dB on 0.300s off 0.300s
call waiting tone #1: 425Hz -18.0dB on 0.040s off 1.960s
call waiting tone #2: 425Hz -18.0dB on 0.040s off 1.960s
special dial tone: 350+375+400Hz -18.0dB continuous
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 425Hz -18.0dB on 0.300s off 0.300s
425Hz -18.0dB on 0.300s off 1.500s
confirmation tone: 300+425Hz -18.0dB on 1.000s off 0.200s
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Iceland

Country Code: 11,iceland
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: DTMF
first TAS type: line reversal
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.250s off 0.250s
congestion tone: 425Hz -18.0dB on 0.250s off 0.250s
call waiting tone #1: 4x(425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s off 3.600s
425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s)
call waiting tone #2: 4x(425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s off 3.600s
425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s)
special dial tone: 425Hz -18.0dB on 0.400s off 0.040s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 425Hz -18.0dB on 0.400s off 15.000s
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

# Italy

Country Code: 12,italy
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms

second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.600s off 1.000s
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.500s off 0.500s
congestion tone: 425Hz -18.0dB on 0.200s off 0.200s
call waiting tone #1: 425Hz -18.0dB on 0.400s off 0.100s
425Hz -18.0dB on 0.250s off 0.100s
425Hz -18.0dB on 0.150s
call waiting tone #2: 425Hz -18.0dB on 0.400s off 0.100s
425Hz -18.0dB on 0.250s off 0.100s
425Hz -18.0dB on 0.150s
special dial tone: 425Hz -18.0dB continuous
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Luxembourg

Country Code: 13,luxembourg
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 65.0 Vrms
onTime1: 2.00 seconds

offTime1: 4.00 seconds
onTime2: 2.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.480s off 0.480s
congestion tone: 425Hz -18.0dB on 0.240s off 0.240s
call waiting tone #1: 425Hz -18.0dB continuous
call waiting tone #2: 425Hz -18.0dB continuous
special dial tone: 400Hz -18.0dB continuous
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s

warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Netherlands

Country Code: 14,netherlands
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.500s off 0.500s
congestion tone: 425Hz -18.0dB on 0.250s off 0.250s
call waiting tone #1: 425Hz -18.0dB on 0.500s off 9.500s
call waiting tone #2: 425Hz -18.0dB on 0.500s off 9.500s
special dial tone: 425Hz -18.0dB on 0.500s off 0.050s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Norway

Country Code: 15,norway
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz

amplitude: 35.0 Vrms
onTime1: 0.20 seconds
offTime1: 0.20 seconds
onTime2: 0.40 seconds
offTime2: 0.20 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.500s off 0.500s
congestion tone: 425Hz -18.0dB on 0.200s off 0.200s
call waiting tone #1: 425Hz -18.0dB on 0.200s off 0.600s
425Hz -18.0dB on 0.200s off 10.000s

call waiting tone #2: 425Hz -18.0dB on 0.200s off 0.600s
425Hz -18.0dB on 0.200s off 10.000s
special dial tone: 470Hz -18.0dB on 0.400s off 0.400s
425Hz -18.0dB on 0.400s off 0.400s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.400s off 15.000s
confirmation tone: 470Hz -18.0dB on 0.400s off 0.400s
425Hz -18.0dB on 0.400s off 0.400s
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Poland

Country Code: 16,poland
law: alaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 66.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.500s off 0.500s
congestion tone: 425Hz -18.0dB on 0.500s off 0.500s
call waiting tone #1: 400Hz -18.0dB on 0.150s off 0.150s
400Hz -18.0dB on 0.150s off 4.000s
call waiting tone #2: 400Hz -18.0dB on 0.150s off 0.150s
400Hz -18.0dB on 0.150s off 4.000s
special dial tone: 425Hz -18.0dB on 0.975s off 0.050s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 425Hz -18.0dB on 0.150s off 0.150s
425Hz -18.0dB on 0.150s off 4.000s
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Portugal

Country Code: 17,portugal

law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 35.0 Hz
amplitude: 66.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 5.000s
busy tone: 425Hz -18.0dB on 0.500s off 0.500s
congestion tone: 425Hz -18.0dB on 0.200s off 0.200s
call waiting tone #1: 425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s off 5.000s
call waiting tone #2: 425Hz -18.0dB on 0.200s off 0.600s
425Hz -18.0dB on 0.200s off 3.000s
special dial tone: 425Hz -18.0dB on 1.000s off 0.200s
howler tone: 1400+1800Hz -3.0dB on 0.200s off 0.265s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 425Hz -18.0dB on 1.000s off 0.200s
holding tone: 425Hz -18.0dB on 1.500s off 5.120s

## Slovakia

Country Code: 18,slovakia
law: alaw
impedance: 220ohm_820ohm_120nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 66.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms

makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB on 0.330s off 0.330s
425Hz -18.0dB on 0.660s off 0.660s
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.330s off 0.330s
congestion tone: 425Hz -18.0dB on 0.165s off 0.165s
call waiting tone #1: 425Hz -18.0dB on 0.330s off 9.000s
call waiting tone #2: 425Hz -18.0dB on 0.330s off 9.000s
special dial tone: 3x(425Hz -18.0dB on 0.165s off 0.165s)
425Hz -18.0dB on 0.660s off 0.660s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

# Spain

Country Code: 19,spain
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 57.0 Vrms
onTime1: 1.50 seconds
offTime1: 3.00 seconds
onTime2: 1.50 seconds
offTime2: 3.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms

second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.500s off 3.000s
busy tone: 425Hz -18.0dB on 0.200s off 0.200s
congestion tone: 2x(425Hz -18.0dB on 0.200s off 0.200s)
425Hz -18.0dB on 0.200s off 0.600s
call waiting tone #1: 425Hz -18.0dB on 0.175s off 0.175s
425Hz -18.0dB on 0.175s off 3.500s
call waiting tone #2: 425Hz -18.0dB on 0.175s off 0.175s
425Hz -18.0dB on 0.175s off 3.500s
special dial tone: 425Hz -18.0dB on 1.000s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 425Hz -18.0dB on 0.400s off 5.000s
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Sweden

Country Code: 20,sweden
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 5.00 seconds
onTime2: 1.00 seconds

offTime2: 5.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 200 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: DTMF
first TAS type: line reversal
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 5.000s
busy tone: 425Hz -18.0dB on 0.250s off 0.250s
congestion tone: 425Hz -18.0dB on 0.250s off 0.750s
call waiting tone #1: 1x(425Hz -18.0dB on 0.200s off 0.500s
425Hz -18.0dB on 0.200s)
call waiting tone #2: 425Hz -18.0dB on 0.200s off 0.600s
425Hz -18.0dB on 0.200s off 3.000s
425Hz -18.0dB on 0.200s off 0.600s
425Hz -18.0dB on 0.200s

special dial tone: 425Hz -18.0dB on 0.320s off 0.020s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.100s off 1.500s
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Switzerland

Country Code: 21,switzerland
law: alaw
impedance: 220ohm_820ohm_115nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz

onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.500s off 0.500s
congestion tone: 425Hz -18.0dB on 0.200s off 0.200s
call waiting tone #1: 425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s off 4.000s
call waiting tone #2: 425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s off 4.000s
special dial tone: 425+340Hz -18.0dB on 1.100s off 1.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## United Kingdom

Country Code: 22,uk
law: alaw
impedance: 300ohm_1000ohm_220nf
loop current: 25 mA

tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 0.40 seconds
offTime1: 0.20 seconds
onTime2: 0.40 seconds
offTime2: 2.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: UK
first TAS type: line reversal
second TAS type: DT-AS
first TAS interval: 300 ms
second TAS interval: 150 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 350Hz -22.0dB + 440Hz -18.0dB continuous
ring back tone: 400+450Hz -18.0dB on 0.400s off 0.200s

400+450Hz -18.0dB on 0.400s off 2.000s
busy tone: 400Hz -18.0dB on 0.375s off 0.375s
congestion tone: 400Hz -18.0dB on 0.400s off 0.350s
400Hz -18.0dB on 0.225s off 0.525s
call waiting tone #1: 400Hz -18.0dB on 0.100s off 3.000s
call waiting tone #2: 400Hz -18.0dB on 0.250s off 0.250s
400Hz -18.0dB on 0.250s off 0.250s
400Hz -18.0dB on 0.250s off 5.000s
special dial tone: 350+440Hz -18.0dB on 0.750s off 0.750s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 1400Hz -18.0dB on 20.000s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Germany

Country Code: 23,germany
law: alaw
impedance: 220ohm_820ohm_120nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms

makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.480s off 0.480s
congestion tone: 425Hz -18.0dB on 0.240s off 0.240s
call waiting tone #1: 425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s off 5.000s
call waiting tone #2: 425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s off 5.000s
special dial tone: 425+400Hz -18.0dB continuous
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 425Hz -18.0dB on 0.240s off 0.240s
425Hz -18.0dB on 0.240s off 1.280s
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

# Greece

Country Code: 24,greece
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 37.0 Hz
amplitude: 57.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms

second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB on 0.200s off 0.300s
425Hz -18.0dB on 0.700s off 0.800s
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.300s off 0.300s
congestion tone: 425Hz -18.0dB on 0.150s off 0.150s
call waiting tone #1: 425Hz -18.0dB on 0.300s off 10.000s
call waiting tone #2: 425Hz -18.0dB on 0.300s off 10.000s
special dial tone: 400Hz -18.0dB on 0.200s off 0.300s
425Hz -18.0dB on 0.700s off 0.800s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 900Hz -18.0dB on 0.500s off 0.500s

## Australia

Country Code: 25,australia
law: alaw
impedance: 220ohm_820ohm_120nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 0.40 seconds
offTime1: 0.20 seconds
onTime2: 0.40 seconds
offTime2: 2.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 0.400s off 0.200s
425Hz -18.0dB on 0.400s off 2.000s
busy tone: 425Hz -18.0dB on 0.375s off 0.375s
congestion tone: 425Hz -18.0dB on 0.375s off 0.375s
call waiting tone #1: 425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s off 4.400s
call waiting tone #2: 425Hz -18.0dB on 0.200s off 0.200s
425Hz -18.0dB on 0.200s off 4.400s
special dial tone: 400+425+450Hz -18.0dB on 0.100s off 0.040s
howler tone: 1500Hz -3.0dB on 10.000s off continuous
warning tone: 900Hz -18.0dB on 0.500s off continuous

confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440Hz -13.0dB on 0.300s off continuous

## New Zealand

Country Code: 26,new_zealand
law: alaw
impedance: 370ohm_620ohm_310nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 0.40 seconds
offTime1: 0.20 seconds
onTime2: 0.40 seconds
offTime2: 2.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:

CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 400Hz -18.0dB continuous
ring back tone: 400+450Hz -18.0dB on 0.400s off 0.200s
400+450Hz -18.0dB on 0.400s off 2.000s
busy tone: 400Hz -18.0dB on 0.500s off 0.500s
congestion tone: 400Hz -18.0dB on 0.250s off 0.250s
call waiting tone #1: 3x(400Hz -18.0dB on 0.200s off 3.000s)
400Hz -18.0dB on 0.200s
call waiting tone #2: 3x(400Hz -18.0dB on 0.100s off 0.100s
400Hz -18.0dB on 0.100s off 3.000s)
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 400+450Hz -18.0dB on 0.200s off 0.400s
400+450Hz -18.0dB on 2.000s off 0.400s
holding tone: 400+450Hz -18.0dB on 0.500s off 0.500s
400+450Hz -18.0dB on 0.500s off 2.500s

## Hong Kong

Country Code: 27,hongkong
law: ulaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz

amplitude: 66.0 Vrms
onTime1: 0.40 seconds
offTime1: 0.20 seconds
onTime2: 0.40 seconds
offTime2: 3.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: during ring
payload type: MDMF
first TAS type: NULL
second TAS type: NULL
first TAS interval: 0 ms
second TAS interval: 0 ms
start to ring: 500 ms (prior ring only)

Tones parameters:
dial tone: 350+440Hz -18.0dB continuous
ring back tone: 440+480Hz -18.0dB on 0.400s off 0.200s
440+480Hz -18.0dB on 0.400s off 3.000s
busy tone: 480+620Hz -18.0dB on 0.500s off 0.500s
congestion tone: 480+620Hz -18.0dB on 0.250s off 0.250s
call waiting tone #1: 450Hz -18.0dB on 0.400s off 4.000s

call waiting tone #2: 450Hz -18.0dB on 0.400s off 4.000s
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Singapore

Country Code: 28,singapore
law: alaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 22.0 Hz
amplitude: 66.0 Vrms
onTime1: 0.40 seconds
offTime1: 0.20 seconds
onTime2: 0.40 seconds
offTime2: 2.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:

frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 0.400s off 0.200s
425Hz -18.0dB on 0.400s off 2.000s
busy tone: 425Hz -18.0dB on 0.750s off 0.750s
congestion tone: 425Hz -18.0dB on 0.250s off 0.250s
call waiting tone #1: 425Hz -18.0dB on 0.300s off 0.200s
425Hz -18.0dB on 0.300s off 3.200s
call waiting tone #2: 425Hz -18.0dB on 0.300s off 0.200s
425Hz -18.0dB on 0.300s off 3.200s
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 425Hz -18.0dB on 0.624s off 4.376s
confirmation tone: 425Hz -18.0dB on 0.125s off 0.125s
holding tone: 425Hz -18.0dB on 0.500s off 2.500s

## Morocco

Country Code: 29,morocco
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 65.0 Vrms
onTime1: 2.00 seconds
offTime1: 4.00 seconds
onTime2: 2.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.700s off 3.300s
busy tone: 425Hz -18.0dB on 0.500s off 0.500s

congestion tone: 425Hz -18.0dB on 0.500s off 0.500s
call waiting tone #1: 440Hz -18.0dB on 0.300s off 10.000s
440Hz -18.0dB on 0.300s off continuous
call waiting tone #2: 440Hz -18.0dB on 0.300s off 10.000s
440Hz -18.0dB on 0.300s off continuous
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Ireland

Country Code: 30,ireland
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 0.40 seconds
offTime1: 0.20 seconds
onTime2: 0.40 seconds
offTime2: 2.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms

makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: RP-AS
second TAS type: NULL
first TAS interval: 600 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 400Hz -18.0dB continuous
ring back tone: 400+450Hz -18.0dB on 0.400s off 0.200s
400+450Hz -18.0dB on 0.400s off 2.000s
busy tone: 425Hz -18.0dB on 0.500s off 0.500s
congestion tone: 425Hz -18.0dB on 0.500s off 0.500s
call waiting tone #1: 425Hz -18.0dB on 0.180s off 0.200s
425Hz -18.0dB on 0.200s off 4.500s
call waiting tone #2: 425Hz -18.0dB on 0.180s off 0.200s
425Hz -18.0dB on 0.200s off 4.500s
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

# Malaysia

Country Code: 31,malaysia
law: alaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 0.40 seconds
offTime1: 0.20 seconds
onTime2: 0.40 seconds
offTime2: 2.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms

second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 0.400s off 0.200s
425Hz -18.0dB on 0.400s off 2.000s
busy tone: 425Hz -18.0dB on 0.500s off 0.500s
congestion tone: 425Hz -18.0dB on 0.500s off 0.250s
call waiting tone #1: 440Hz -18.0dB on 0.300s off 10.000s
440Hz -18.0dB on 0.300s off continuous
call waiting tone #2: 440Hz -18.0dB on 0.300s off 10.000s
440Hz -18.0dB on 0.300s off continuous
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Russia

Country Code: 32,russia
law: alaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 2.00 seconds
offTime1: 4.00 seconds
onTime2: 2.00 seconds

offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 0.800s off 3.200s
busy tone: 425Hz -18.0dB on 0.400s off 0.400s
congestion tone: 425Hz -18.0dB on 0.400s off 0.400s
call waiting tone #1: 950Hz -18.0dB on 0.333s
1400Hz -18.0dB on 0.333s
1800Hz -18.0dB on 0.333s off 1.000s
call waiting tone #2: 950Hz -18.0dB on 0.333s
1400Hz -18.0dB on 0.333s
1800Hz -18.0dB on 0.333s off 1.000s

special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Thailand

Country Code: 33,thailand
law: alaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz

onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 400Hz -18.0dB continuous
ring back tone: 400Hz -18.0dB on 1.000s off 4.000s
busy tone: 400Hz -18.0dB on 0.500s off 0.500s
congestion tone: 425Hz -18.0dB on 0.300s off 0.300s
call waiting tone #1: 400Hz -18.0dB on 1.000s off 10.000s
400Hz -18.0dB on 1.000s
call waiting tone #2: 400Hz -18.0dB on 1.000s off 10.000s
400Hz -18.0dB on 1.000s
special dial tone: 400Hz -18.0dB on 0.400s off 0.100s
400Hz -18.0dB on 0.400s off 0.100s
400Hz -18.0dB continuous
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Israel

Country Code: 34,israel
law: alaw

impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 3.00 seconds
onTime2: 1.00 seconds
offTime2: 3.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:

dial tone: 400Hz -18.0dB continuous
ring back tone: 400Hz -18.0dB on 1.000s off 3.000s
busy tone: 400Hz -18.0dB on 0.500s off 0.500s
congestion tone: 400Hz -18.0dB on 0.500s off 0.500s
call waiting tone #1: 1x(400Hz -18.0dB on 0.500s off 10.000s
400Hz -18.0dB on 0.500s)
call waiting tone #2: 1x(400Hz -18.0dB on 0.500s off 10.000s
400Hz -18.0dB on 0.500s)
special dial tone: 400Hz -18.0dB on 1.000s off 0.250s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 1x(400Hz -18.0dB on 0.170s off 0.140s
400Hz -18.0dB on 0.340s)
holding tone: 400Hz -18.0dB on 0.050s off 2.000s

## United Arab Emirates

Country Code: 35,uae
law: alaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 2.00 seconds
offTime1: 4.00 seconds
onTime2: 2.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms

makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 350+440Hz -18.0dB continuous
ring back tone: 400+450Hz -18.0dB on 0.400s off 0.200s
400+450Hz -18.0dB on 0.400s off 2.000s
busy tone: 400Hz -18.0dB on 0.375s off 0.375s
congestion tone: 400Hz -18.0dB on 0.400s off 0.350s
400Hz -18.0dB on 0.225s off 0.525s
call waiting tone #1: 440Hz -18.0dB on 0.300s off 10.000s
440Hz -18.0dB on 0.300s off continuous
call waiting tone #2: 440Hz -18.0dB on 0.300s off 10.000s
440Hz -18.0dB on 0.300s off continuous
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s

350+440Hz -18.0dB on 0.500s off 2.500s

## China

Country Code: 36,china
law: alaw
impedance: 200ohm_680ohm_100nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS

second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 450Hz -18.0dB continuous
ring back tone: 450Hz -18.0dB on 1.000s off 4.000s
busy tone: 450Hz -18.0dB on 0.350s off 0.350s
congestion tone: 450Hz -18.0dB on 0.700s off 0.700s
call waiting tone #1: 450Hz -18.0dB on 0.400s off 4.000s
call waiting tone #2: 450Hz -18.0dB on 0.400s off 4.000s
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Ukraine

Country Code: 37,ukraine
law: alaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 2.00 seconds
offTime1: 4.00 seconds
onTime2: 2.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 0.800s off 3.200s
busy tone: 425Hz -18.0dB on 0.400s off 0.400s
congestion tone: 425Hz -18.0dB on 0.400s off 0.400s
call waiting tone #1: 950Hz -18.0dB on 0.333s
1400Hz -18.0dB on 0.333s
1800Hz -18.0dB on 0.333s off 1.000s
call waiting tone #2: 950Hz -18.0dB on 0.333s
1400Hz -18.0dB on 0.333s
1800Hz -18.0dB on 0.333s off 1.000s
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s

howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## South Africa

Country Code: 38,south_africa
law: alaw
impedance: 220ohm_820ohm_120nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 0.40 seconds
offTime1: 0.20 seconds
onTime2: 0.40 seconds
offTime2: 2.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms

offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 400Hz -18.0dB continuous
ring back tone: 400Hz -18.0dB on 0.400s off 0.200s
400Hz -18.0dB on 0.400s off 2.000s
busy tone: 400Hz -18.0dB on 0.500s off 0.500s
congestion tone: 400Hz -18.0dB on 0.250s off 0.250s
call waiting tone #1: 400Hz -18.0dB on 0.400s off 4.000s
call waiting tone #2: 400Hz -18.0dB on 0.400s off 4.000s
special dial tone: 400Hz -18.0dB on 0.250s off 0.250s
400Hz -18.0dB continuous
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 700Hz -18.0dB on 0.250s off 0.250s
1100Hz -18.0dB on 0.250s off 0.250s
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## South Korea

Country Code: 39,south_korea
law: alaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 2.00 seconds
onTime2: 1.00 seconds
offTime2: 2.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 350+440Hz -18.0dB continuous
ring back tone: 440+480Hz -18.0dB on 1.000s off 2.000s
busy tone: 480+620Hz -18.0dB on 0.500s off 0.500s
congestion tone: 480+620Hz -18.0dB on 0.300s off 0.200s

call waiting tone #1: 350+440Hz -18.0dB on 0.250s off 0.250s
350+440Hz -18.0dB on 0.250s off 3.250s
call waiting tone #2: 350+440Hz -18.0dB on 0.250s off 0.250s
350+440Hz -18.0dB on 0.250s off 3.250s
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 2x(392Hz -18.0dB on 0.500s
494Hz -18.0dB on 0.500s
587Hz -18.0dB on 1.500s)
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Philippines

Country Code: 40,philippines
law: alaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms

makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425+480Hz -18.0dB on 1.000s off 4.000s
busy tone: 480+620Hz -18.0dB on 0.500s off 0.500s
congestion tone: 480+620Hz -18.0dB on 0.250s off 0.250s
call waiting tone #1: 440Hz -18.0dB on 0.300s off 10.000s
call waiting tone #2: 440Hz -18.0dB on 0.300s off 10.000s
special dial tone: 400+25Hz -18.0dB continuous
howler tone: 1400+1800Hz -3.0dB on 0.200s off 0.300s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off 0.100s
350+440Hz -18.0dB on 0.100s off continuous
holding tone: 950Hz -18.0dB on 0.650s off 0.325s
950Hz -18.0dB on 0.325s
1400Hz -18.0dB on 1.300s off 2.000s

# India

Country Code: 41,india
law: alaw
impedance: 370ohm_620ohm_310nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 0.40 seconds
offTime1: 0.20 seconds
onTime2: 0.40 seconds
offTime2: 2.60 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms

second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 400Hz -18.0dB continuous
ring back tone: 400Hz -18.0dB on 0.400s off 0.200s
400Hz -18.0dB on 0.400s off 2.000s
busy tone: 400Hz -18.0dB on 0.750s off 0.750s
congestion tone: 400Hz -18.0dB on 0.250s off 0.250s
call waiting tone #1: 400Hz -18.0dB on 0.200s off 0.100s
400Hz -18.0dB on 0.200s off 7.500s
call waiting tone #2: 400Hz -18.0dB on 0.200s off 0.100s
400Hz -18.0dB on 0.200s off 7.500s
special dial tone: 400Hz -18.0dB on 2.800s off 0.200s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 400Hz -18.0dB on 1.000s off 4.000s
holding tone: 400Hz -18.0dB on 0.250s off 0.250s
400Hz -18.0dB on 0.250s off 3.250s

## Turkey

Country Code: 42,turkey
law: alaw
impedance: 270ohm_750ohm_150nf
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 2.00 seconds
offTime1: 4.00 seconds
onTime2: 2.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 450Hz -18.0dB continuous
ring back tone: 450Hz -18.0dB on 2.000s off 4.000s
busy tone: 450Hz -18.0dB on 0.500s off 0.500s
congestion tone: 3x(450Hz -18.0dB on 0.200s off 0.200s)
450Hz -18.0dB on 0.600s off 0.200s
call waiting tone #1: 450Hz -18.0dB on 0.200s off 0.600s
450Hz -18.0dB on 0.200s off 8.000s
call waiting tone #2: 450Hz -18.0dB on 0.200s off 0.600s
450Hz -18.0dB on 0.200s off 8.000s
special dial tone: 450Hz -18.0dB on 1.000s off 0.250s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 450Hz -18.0dB on 0.200s off 0.200s

450Hz -18.0dB on 0.600s off 0.200s
confirmation tone: 450Hz -18.0dB on 0.040s off 0.040s
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Vietnam

Country Code: 43,vietnam
law: alaw
impedance: 600ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 20.0 Hz
amplitude: 53.0 Vrms
onTime1: 2.00 seconds
offTime1: 4.00 seconds
onTime2: 2.00 seconds
offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:

CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 350+440Hz -18.0dB continuous
ring back tone: 440+480Hz -18.0dB on 2.000s off 4.000s
busy tone: 480+620Hz -18.0dB on 0.500s off 0.500s
congestion tone: 480+620Hz -18.0dB on 0.300s off 0.200s
call waiting tone #1: 2x(440Hz -18.0dB on 0.300s off 10.000s)
call waiting tone #2: 2x(440Hz -18.0dB on 0.300s off 10.000s)
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 3x(350+440Hz -18.0dB on 0.100s off 0.100s)
holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s
350+440Hz -18.0dB on 0.500s off 2.500s

## Brazil

Country Code: 44,brazil
law: alaw
impedance: 900ohm
loop current: 25 mA
tax type: metering

Ring parameters:
frequency: 25.0 Hz
amplitude: 53.0 Vrms
onTime1: 1.00 seconds
offTime1: 4.00 seconds
onTime2: 1.00 seconds

offTime2: 4.00 seconds

Pulse parameters:
flashMin: 90 ms
flashMax: 500 ms
breakMin: 47 ms
breakMax: 80 ms
makeMin: 30 ms
makeMax: 55 ms
interDigitMin: 250 ms

Meter parameters:
frequency: 12 kHz
onTime: 200 ms
offTime: 200 ms

Caller ID parameters:
CID type: prior ring
payload type: ETSI-MDMF
first TAS type: DT-AS
second TAS type: NULL
first TAS interval: 300 ms
second TAS interval: 0 ms
start to ring: 400 ms (prior ring only)

Tones parameters:
dial tone: 425Hz -18.0dB continuous
ring back tone: 425Hz -18.0dB on 1.000s off 4.000s
busy tone: 425Hz -18.0dB on 0.250s off 0.250s
congestion tone: 425Hz -18.0dB on 0.250s off 0.250s
call waiting tone #1: 425Hz -18.0dB on 0.050s off 1.000s
call waiting tone #2: 425Hz -18.0dB on 0.050s off 1.000s
special dial tone: 350+440Hz -18.0dB on 0.100s off 0.100s
howler tone: 1400+2060+2450+2600Hz -3.0dB on 0.100s off 0.100s
warning tone: 1400Hz -18.0dB on 0.500s off continuous
confirmation tone: 425Hz -18.0dB on 0.100s off 0.100s

425Hz -18.0dB on 0.100s off 2.000s

holding tone: 440+480Hz -18.0dB on 0.500s off 0.500s

350+440Hz -18.0dB on 0.500s off 2.500s

# B

# Legal Information

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This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:

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- This device must accept any interference received, including interference that may cause undesired operations.

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This device has been tested and found to comply with the limits for a Class A digital switch, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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CLASS 1 LASER PRODUCT

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PRODUCT COMPLIES WITH 21 CFR 1040.10 AND 1040.11.

PRODUIT CONFORME SELON 21 CFR 1040.10 ET 1040.11.

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# C

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"+" is the (prefix) number you dial to make an international telephone call.

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# Index

## Numerics


1000/100 Ethernet ports **67**
1000Base-T **67**
100Base-Tx 2 **67**
1-bit constellation **195**, **207**
802.1X PNAC **117**
8-wire **272**


## A


abbreviating commands **439**
AbS **414**
acceptable frame type **397**
access control **382**
Access Control List **91**
  commands **443**
ACL **91**
acl commands **443**
acl dhcprelay82 commands **449**
acl macfilter commands **461**
acl ouifilter commands **463**
ACL rule **122**
acl rule commands **468**, **470**
ACO **66**
ACT LED **66**
Address Resolution Protocol **418**
Address Resolution Protocol, See ARP **301**, **465**, **500**
administrator account **730**, **733**
ADSL
  advanced port setup **190**
  alarm profile **278**, **603**
  disable features **194**, **206**
  downstream rate **268**
  Extension Line MIB (RFC 3440) **380**
  Line MIB (RFC 2662) **380**
  loopback **155**, **495**
  operational mode **543**
  port setup **186**, **189**, **259**, **261**
  profile **266**, **600**
  rate **267**, **268**
  rates **266**
  upstream rate **267**
adsl commands **536**
ADSL standards **181**
ADSL2/2+ features **192**
age **358**
ALARM **66**
alarm **143**
  ADSL profile **278**
  command parameters **471**
  commands **471**, **473**
  descriptions **138**
  history **132**
  input **67**
  management **131**
  port **133**
  profile **603**, **606**, **608**
  screens **131**
  severity assignment **136**
  SHDSL profile **282**
  VDSL profile **280**
alarm connections **67**
Alarm Cut Off button **66**
alarm input **143**
alarm profile **186**
  span **219**
  Stuc **219**
  Stur **220**
all digital mode **192**, **538**
analysis-by-synthesis **414**
annex A **273**
annex B **273**
Annex I **192**, **538**
Annex L **537**
Annex M **192**, **538**
annex mode **273**
anti-IP address spoofing **58**, **97**
anti-MAC spoofing **123**
applications **57**
ARP **114**, **301**, **465**, **500**
  filter **114**
Asynchronous Transfer Mode, See ATM. **221**
ATM **221**
  profile **221**, **277**, **610**
  QoS **274**
  traffic classes **275**
  traffic counters **645**
  traffic settings **610**
authentication
  mode **390**
  settings **730**

available commands 440

## B

back pressure flow control 363
bandwidth control 363, 680
bit number 441
bitswap 195, 207
BPDUs 353
BRIDGE Extension MIB (RFC 2674) 380
BRIDGE MIB (RFC 1573) 380
Bridge Protocol Data Units, See BPDUs. 353
broadcast storm control 61, 363, 682
BT 276
Burst Tolerance, See BT. 276

## C

cable dust covers 69
Canonical Format Indicator, See CFI. 395
carrier setup 193
carrier tones 193, 539, 544
CBR 275
CDVT 276
cell counter 320
Cell Delay Variation Tolerance, See CDVT. 276
certifications 861
  notices 862
  viewing 862
CFM 151, 646
  Connectivity Check (CC) 151
  Connectivity Fault 151
  how it works 151
  LBR 375
  Link trace test 152
  Loopback test 152
  MA 151
  MD 151
  MEP 151
  MIP 151
CFM endpoint
  MEP 371
  MIP 373
chassis 718
  number 385
  slot 441
CI commands 439
circuit-switched telephone networks 403
CIST 356
Class of Service (CoS) 62
classifier 60
clear 143
  alarm 143
  commands 479
CLI 439
clicks 414
client server
  SIP 404
client-server protocol 404
cluster
  commands 481
  disable command 482
  enable manager command 482
  enable member command 482
  login command 483
  management disable 482
  manager 145
  member 145
  member candidate flush command 483
  member candidate show command 483
  member delete command 483
  member set command 484
  member show command 484
  show command 484
  vlan command 486
cluster management 59, 145
  and switch passwords 148, 149
  cluster manager 145
  cluster member 145, 148
  cluster member firmware upgrade 486
  member candidate flush 483
  member candidate show 483
  member delete 483
  member set 484
  member show 484
  network example 145
  setup 147
  show 484
  specification 145
  status 146
  switch models 145
  VID 148
  vlan 486
  web configurator 149
codec 414
coder/decoder 414
command
  abbreviation 439
  acl 443
  bit number parameter 441
  common notation 441
  config save 442
  conventions 439
  details 440

help 440
high privilege 442
IP address parameter 441
list 440
low privilege 442
MAC address parameter 441
middle privilege 442
notation 441
parameters 441
port parameter 441
privilege levels 442
slot parameter 441
subnet mask parameter 441
summary 442
UDP or TCP port number 441
VCI parameter 441
VLAN ID parameter 441
VPI parameter 441
Command Line Interface, See CLI. 439
commands
acl dhcosnoop pool delete 454
acl dhcprelay82 449
acl dhcprelay82 clearinfo 449
acl dhcprelay82 enable 449
acl dhcprelay82 info 450
acl dhcprelay82 optionmode 450
acl dhcprelay82 relaymode 450
acl dhcprelay82 server active 451
acl dhcprelay82 server delete 451
acl dhcprelay82 server set 451
acl dhcprelay82 set 452
acl dhcprelay82 show 452
acl dhcpsnoop disable 454
acl dhcpsnoop enable 454
acl dhcpsnoop flush 454
acl dhcpsnoop pool set 454
acl dhcpsnoop show 455
acl dot1x disable 455
acl dot1x enable 455
acl dot1x port control 455
acl dot1x port disable 456
acl dot1x port enable 456
acl dot1x port period 456
acl dot1x port reauth 456
acl dot1x port show 456
acl dot1x radius ip 457
acl dot1x radius port 457
acl dot1x radius secret 457
acl dot1x show 458
acl dscp 458
acl dscp show 458, 459
acl maccount disable 459
acl maccount enable 460
acl maccount set 460
acl maccount show 460
acl macfilter delete 461
acl macfilter disable 462
acl macfilter enable 462
acl macfilter mode 462
acl macfilter set 462
acl macfilter show 463
acl ouifilter disable 463
acl ouifilter enable 463
acl ouifilter mode 464
acl ouifilter set 464
acl ouifilter show 464
acl pktfilter set 465
acl pktfilter show 466
acl pppoeagent clearinfo 466
acl pppoeagent delete 467
acl pppoeagent disable 467
acl pppoeagent enable 466
acl pppoeagent info 467
acl pppoeagent relaymode 467
acl pppoeagent set 468
acl pppoeagent show 468
acl rule delete 468
acl rule set 469
acl rule show 469
adsl ipbpvc route show 561
alarm clear 473
alarm cutoff 473
alarm edit 473
alarm history clear 473
alarm history show 474
alarm port set 474
alarm port show 474
alarm show 475
alarm tablelist 476
alarm xedit 477
cluster disable 482
cluster enable manager 482
cluster enable member 482
cluster login 483
cluster member candidate flush 483
cluster member candidate show 483
cluster member delete 483
cluster member set 484
cluster member show 484
cluster show 484
cluster vlan 486
config default 487
config save 487
config show 488
diagnostic ldm show 492, 493, 495
diagnostic ldm test 494
diagnostic loopback f5 495
diagnostic mlt relay set 496, 497
diagnostic mlt show 496
diagnostic mlt test 496
diagnostic selt show 497
diagnostic selt test 497
enet 545
ip arp flush 500
ip arp show 500
ip gateway 500
ip ping 501

ip route delete 501
ip route set 501
ip route show 502
ip set 502
ip show 502
ip tracert 504
lcman disable 505
lcman enable 505
lcman reset 506
lcman show 506
mac aging 695
multicast bandwidth default 512
multicast bandwidth delete 512
multicast bandwidth port disable 513
multicast bandwidth port enable 513
multicast bandwidth port set 513
multicast bandwidth port show 514
multicast bandwidth set 512
multicast igmp disable 514, 515
multicast igmp enable 515
multicast igmp qryvid delete 515
multicast igmp qryvid set 515
multicast igmp qryvid show 516
multicast igmp show 516
multicast igmpcount disable 516
multicast igmpcount enable 517
multicast igmpcount set 517
multicast igmpcount show 517
multicast igmpfilter set 518
multicast igmpfilter show 518
multicast mvlan delete 519, 520
multicast mvlan disable 520
multicast mvlan enable 521
multicast mvlan group delete 521
multicast mvlan group set 521
multicast mvlan name 521
multicast mvlan set 522
multicast mvlan show 522
multicast smcast delete 522
multicast smcast set 523
multicast smcast show 523
port adsl alarmprof 536
port adsl annexi disable 538
port adsl annexi enable 538
port adsl annexl disable 537
port adsl annexl enable 537
port adsl annexm disable 537
port adsl annexm enable 538
port adsl dscarrier0 538
port adsl dscarrier1 539
port adsl inpmin 540
port adsl optionmask 540
port adsl pmm disable 541
port adsl pmm enable 541
port adsl power 542
port adsl psd maximum 543
port adsl set 543
port adsl uscarrier 544
port copy 544
port disable 545
port enable 545
port enet 545
port enet bandwidth 545
port enet dot3ad aggport 546
port enet dot3ad disable 546
port enet dot3ad enable 546
port enet dot3ad show 546
port enet flowctrl disable 547
port enet flowctrl enable 547
port enet frametype 547
port enet priority 548
port enet pvid 548
port enet show 548
port enet tls 549
port enet vlan 550
port ipbpvc arpproxy age 550, 551, 552
port ipbpvc arpproxy flush 552
port ipbpvc arpproxy show 552
port ipbpvc delete 553
port ipbpvc domain delete 554
port ipbpvc domain dhcpvlan disable 554
port ipbpvc domain dhcpvlan enable 554
port ipbpvc domain set 555
port ipbpvc domain show 555
port ipbpvc domain vlan 556
port ipbpvc route delete 560
port ipbpvc route set 560
port ipbpvc set 561
port ipbpvc show 562
port ipbpvc vlan 563
port name 563
port paepvc delete 564
port paepvc set 564
port paepvc show 565
port ppvc delete 566
port ppvc member delete 566
port ppvc member set 566
port ppvc set 567
port ppvc show 567
port ppvc vlan 568
port pvc delete 569
port pvc mvlan disable 569
port pvc mvlan enable 569
port pvc set 569
port pvc show 570
port pvc usratelimit disable 570
port pvc usratelimit enable 570
port pvc usratelimit set 570
port pvc usratelimit show 571
port pvc vlan 571
port shdsl alarmprof 572
port shdsl pbo 572
port shdsl pmms 573
port shdsl set 574
port show 574
port sip set 574, 575
port tel 575
port tlspvc delete 576

port tlspvc show **577**
pots gain **565**
profile acl delete **598**
profile acl set **598**
profile acl show **600**
profile adsl delete **602**
profile adsl map **602**
profile adsl set **600**
profile adsl show **603**
profile alarmadsl delete **605**
profile alarmadsl map **605**
profile alarmadsl set **604**
profile alarmadsl show **603**
profile alarmshdsl delete **607**
profile alarmshdsl map **607**
profile alarmshdsl set **606**
profile alarmshdsl show **606**
profile alarmvdsl delete **609**
profile alarmvdsl map **609**
profile alarmvdsl set **608**
profile alarmvdsl show **608**
profile atm delete **612**
profile atm map **612**
profile atm set **610**
profile atm show **610**
profile ipqos delete **615**
profile ipqos map **614**
profile ipqos set **613**
profile ipqos show **613**
profile profsvr clientlist delete **616**
profile profsvr clientlist set **616**
profile profsvr clientlist show **616**
profile profsvr mode **615**
profile profsvr serverset **616**
profile profsvr show **615**
profile profsvr sync **617**
profile shdsl delete **618**
profile shdsl map **618**
profile shdsl set **617**
profile shdsl show **619**
profile voip dsp delete **622**
profile voip dsp map **622**
profile voip dsp set **623**
profile voip dsp show **624**
profile voip sip callsvc delete **629**, **634**, **635**, **636**
profile voip sip callsvc map **630**
profile voip sip callsvc set **630**
profile voip sip callsvc show **633**
profile voip sip delete **625**, **626**, **627**
profile voip sip map **627**
profile voip sip set **627**
show adsl **640**
show adsl linedata **640**
show adsl linegain **641**
show adsl linehlog **642**
show adsl lineqln **642**
show adsl linetssi **643**
show arp **645**
show atm **645**
show cfm **646**
show dhcp counter **647**
show dhcp snoop **647**
show dot3ad **646**
show enet **647**
show igmp **650**
show igmp group **650**
show igmp info **650**
show igmp port group **651**
show igmp port info **651**
show ip **651**
show lineinfo **654**
show linerate **656**
show linestat **657**
show mac **657**
show monitor **658**
show mstp **660**
show packet **661**
show paepvc counter **662**
show paepvc session **663**
show performance **663**
show rmon **665**
show sys **667**
show user **667**
show vdsl linebandplan **668**
show vlan **672**, **673**
switch bandwidth disable **680**
switch bandwidth enable **680**
switch bandwidth set **681**
switch bandwidth show **681**
switch bcastctrl show **682**, **683**
switch bcastctrl threshold **682**
switch dot3ad disable **690**
switch dot3ad enable **689**
switch dot3ad lacp priority **688**
switch dot3ad lacp show **689**
switch dot3ad lacp timeout **689**
switch dot3ad show **690**
switch garptimer join **691**
switch garptimer leave **691**
switch garptimer leaveall **692**
switch garptimer set **692**
switch garptimer show **691**
switch isolation disable **693**
switch isolation enable **693**
switch isolation show **693**
switch isolation vlan delete **694**
switch isolation vlan set **694**
switch mstp cfgname **695**, **696**
switch mstp disable **696**
switch mstp fwdelay **696**
switch mstp hellotime **696**
switch mstp maxage **696**
switch mstp maxhops **697**
switch mstp priority **697**
switch mstp revision **697**
switch mstp show **698**
switch mstp version **698**
switch mstp vlanmap **699**

switch port disable 699
switch port dscp 700
switch port dscp disable 700
switch port dscp enable 700
switch port dscp set 700
switch port dscp show 701
switch port enable 701
switch port flowctrl disable 701
switch port flowctrl enable 702
switch port frametype 702
switch port gvrp 702
switch port gvrp disable 702
switch port gvrp enable 703
switch port mode 703
switch port mstp disable 703
switch port mstp edgeport 703
switch port mstp enable 704
switch port mstp p2plink 704
switch port mstp pathcost 704
switch port mstp priority 705
switch port mstp show 705
switch port name 705
switch port priority 706
switch port pvid 706
switch port show 706
switch port speed 707
switch port vlantrunk disable 708
switch port vlantrunk enable 707
switch qschedule set 708
switch qschedule show 709
switch queuemap set 709
switch queuemap show 709
sys baud set 715
sys baud show 715
sys client disable 716
sys client enable 715
sys client set 715
sys client show 716
sys date set 717
sys date show 717
sys info chassis 718
sys info contact 719
sys info frame 719
sys info hostname 719
sys info location 720
sys info show 720
sys monitor set 721
sys monitor show 722
sys multilogin disable 724
sys multilogin enable 723
sys multilogin show 724
sys reboot 724
sys server disable 725
sys server enable 725
sys server port 725
sys server show 726
sys snmp getcommunity 726
sys snmp setcommunity 726
sys snmp show 728
sys snmp trapcommunity 727
sys snmp trapdst 727
sys snmp user 728
sys snmp version 729
sys syslog disable 730
sys syslog enable 729
sys syslog server 729
sys syslog show 730
sys time set 716
sys time show 716
sys timeserver set 717
sys timeserver show 717
sys timeserver sync 718
sys user auth 730
sys user delete 732
sys user disable 733
sys user enable 732
sys user online 733
sys user server 731
sys user set 732
sys user show 733
sys version 714
vlan delete 735
vlan disable 736
vlan enable 736
vlan name 736
vlan set 736
vlan show 737
voip arp flush 743
voip arp show 743
voip countrycode set 743
voip countrycode show 746, 747
voip ip dns 748
voip ip show 748
voip route delete 748
voip sip numberplan delete 752, 754, 755
voip sip numberplan map 756
voip sip numberplan set 756
Common and Internal Spanning Tree, See CIST. 356
config commands 487
Config Save 81
config save command 442, 487
configurable alarms 61
configuration backup 163
configuration digest 359
configuration file 760
backup 163, 760
edit 761
reset 164
restore 163
connection rates 543
CONSOLE 67
console port 58, 70, 723, 773
pin assignments 783
Constant Bit Rate, See CBR. 275
contact information 865

contact person 719
contact person's name 384
copy port settings 227
copyright 861
CRC 607
critical alarm 67
customer support 865
Cyclic Redundancy Checking, See CRC 607

## D

damage 759
database version 385
date 717
decoder 414
default configuration 487
default settings 775
DELT 152
detailed command information 440
DHCP 58, 114, 465
  filter 114
  relay commands 449
  statistics 302
DHCP relay 91
DHCP relay agent information 91
DHCP relay agent82 58
DHCP snooping 58, 96, 453
  anti-IP address spoofing 58, 97
diagnostic 151
  commands 490
  port test 155
dial plan 431
Differentiated Services Code Point, see DSCP
DiffServ
  DSCP 62
  DSCP-to-IEEE 802.1p mapping 62
disable
  ADSL features 194, 206
  carrier tones 193
disclaimer 861
Discrete Multi-Tone 183
Discrete Multi-Tone, See DMT 640
DMT 183, 640
dot1x commands 455
Dot3 MIB (RFC 2665) 380
Dot3ad 334
dot3ad commands 688
double upstream 538
double upstream mode 192
double-tagged frames 59, 210
down-shift noise margin 268, 601
downstream 186
  carrier tones 539
  rates 268
  transmit power 193
Downstream Power Back Off 184
DPBO 184
  Electrical Length 184
DSCP 124
  DSCP-to-IEEE 802.1p mapping 62
dscp Commands 700
DSL profile 186
DTMF 414
Dual End Loop Test, See DELT 152
dual-tone multi-frequency
  see DTMF
duplex 330, 364
Dynamic Host Configuration Protocol, See DHCP 58, 91, 114, 465
dynamic link aggregation 345
dynamic query VID 170
dynamic VLAN 397

## E

EAP 114, 465
EAPoL 465
  filter 114
edge 359
ELC port
  statistics 329, 330
electrical Ethernet interface 67
enet commands 545
EPL 220, 573
error log 61
errored seconds 279, 281, 607
ES 279, 281
Estimated Power Loss, See EPL 220, 573
Ethernet port
  statistics 311, 312
  trunking 345
Ethernet port setup 364
  bandwidth 365
  broadcast 366, 367, 369
  IEEE 802.1p 365, 369
  IEEE 802.1Q 365, 369
Ethernet ports 68
explicit tagging 395
Extensible Authentication Protocol, See EAP. 114

## F

F5 155, 495
F5 loopback 154
facility 387
factory defaults 164
failed fast retrain 280, 281
fan 721
fast mode 266
fast rate 280
FCC interference statement 861
features 779
file upload 761
filename conventions 759
filter
  ARP 114
  DHCP 114
  EAPoL 114
  IGMP 114, 283
  MAC 461
  NetBIOS 114
  PPPoE 114
filtering
  VLAN ingress 397
firmware
  recovery 773
  upgrade 165
  upload to line card 763
fix 737
fixed mode 542
fixed registration 397
flow control 62, 362
  back pressure 363
  IEEE 802.3x 363
forbid 737
forbidden registration 397
force version 358
forwarding
  delay 358
  tagged frames 397
  untagged frames 397
frame number 384, 719
frequency pairs 414
front panel 65
FTP 723
  to cluster member 486

## G

G.711 414
G.723 414
G.726 414
G.729 414
G.991.2 272
G.992.1 640
G.992.3 154
G.lite rate limit 195
gain 565
GARP 396
GARP timer 348, 396
GARP VLAN Registration Protocol, See GVRP. 397
garptimer commands 690
general IP commands 500
general system setup 384
Generic Attribute Registration Protocol, See GARP. 396
Get 380
GetNext 380
Gigabit Ethernet 441
Gigabit Ethernet interface 68
  management 699
Gigabit Ethernet port setup 364
  bandwidth 365
  broadcast 366, 367, 369
  IEEE 802.1p 365, 369
  IEEE 802.1Q 365, 369
Gigabit interface
  interface 3 441
  interface 4 441
GMT 718
Greenwich Mean Time, See GMT 718
GVRP 397
gvrp commands 702

## H

H.248 statistics 343
hello time 358
help facility 440
high privilege 442
hops 358
host name 384
HTTP 723
hybrid waveform codec 414

## I


ICMP **723**
IEEE 802.1p priority **60**
IEEE 802.1Q **397**
  terminology **397**
IEEE 802.1Q tagged VLAN **59**, **395**
IEEE 802.1Q VLAN **415**
IEEE 802.1x **60**, **116**, **117**
IEEE 802.3 **62**
IEEE 802.3ad **334**, **345**, **646**
IEEE 802.3x **363**
ies5000 MIB **380**
ifXTable MIB (RFC 2863) **380**
IGMP **114**, **167**, **465**
  count **60**, **516**
  filter **114**, **170**
  filter profile **283**, **518**
  proxy **61**, **167**
  query VLAN ID **515**
  setup **169**
  snooping **61**, **167**
  status **305**
  v2 **167**, **168**
  v3 **167**, **168**
igmpcount commands **516**
implicit tagging **395**
Impulse Noise Protection **183**
impulse noise protection **193**, **540**
in-band management **386**, **503**
info show command **718**
ingress filtering **397**
initialization failure **280**, **281**
INP **183**
interleave delay **265**, **267**, **270**, **322**, **655**
interleave rate **280**
Internet Group Multicast Protocol, See IGMP. **114**, **167**
Internet Protocol **465**
Internet telephony service provider **403**
introduction **55**
IP **465**
IP address **441**
IP address spoofing **58**, **97**
IP bridge
  ARP proxy commands **552**
  domain commands **553**
  PVC commands **553**
ip commands **499**
IP multicast addresses **167**
IP setup **385**
IP statistics **341**, **342**
ISDN **273**
isolation **59**, **351**
  commands **693**
ITSP **403**


## J


join timer **691**


## L


LACP **345**, **349**
  aggregation ID **346**
  system priority **684**, **685**, **686**, **688**
latch **69**
latency mode **267**, **270**
LBR **375**
lcman commands **505**
LDM **152**
  test **152**
leave all timer **692**
leave timer **692**
LEDs **65**
level of access privileges **732**
limit MAC addresses **104**, **459**
Limit PSD Mask **181**
line
  diagnostics **495**
  performance **323**
  probing **274**
line card **763**
  firmware upload **763**
  statistics **317**
  status **84**
line detail **321**
Link Aggregate Control Protocol, See LACP. **345**
link aggregation **59**, **334**, **646**
  dynamic **345**
  ID **346**
  ID information **346**
Link trace **152**
LLC **221**
LNK LED **66**
lockout **771**
LOF **279**, **281**
log **61**
log facility **729**
login **73**

logout **82**
LOL **279**, **281**
Loop Back Response, see LBR
Loop Diagnostic Mode, See LDM **152**
loop diagnostics **495**
Loopback **152**
loopback **155**, **495**
LOS **279**, **281**
Loss Of Frame, See LOF **279**
Loss Of Link, See LOL. **279**
Loss of Power, See LPR. **279**
Loss Of Signal, See LOS. **279**
loss of sync word seconds **607**
low privilege **442**
LPR **279**, **281**

## M

MA **151**
MAC **301**
  address **441**
  count **104**, **459**
  count filter **60**
  filter **60**, **107**, **108**, **110**, **461**
  table **303**, **304**
mac aging commands **695**
MAC aging out **695**
MAC count **104**
maccount command **459**
machine address **301**
maintenance **163**
Maintenance Association **151**
Maintenance Domain **151**
major alarm **67**
Management Information Base, See MIB. **380**
management VLAN **503**
managing the device
  using FTP. See FTP.
  using Telnet. See command interface.
  using the command interface. See command interface.
mask carrier tones **193**
max
  age **358**
  hops **358**
Maximum Burst Size, See MBS. **276**
MBS **276**
MD **151**
Media Access Control, See MAC. **301**
memory **442**
MEP **151**
MGMT **67**
MGMT LEDs **66**
MIB **380**
middle privilege **442**
mini GBIC ports **68**
  connection speed **68**
  connector type **68**
minimum impulse noise protection **193**
minor alarm **67**
MIP **151**
MLT **158**, **159**, **160**
monitor screen **390**
mpair4 **272**
MSA (MultiSource Agreement) **68**
MST ID **356**
MST Instance, See MSTI. **356**
MST region **355**
MSTI **356**
MSTP **60**, **352**, **354**
  bridge setup **357**
  CIST statistics **336**, **338**
  MSTI statistics **339**
  path cost **352**
  port setup **359**
  setup **357**
  statistics **336**
MTU **395**
multicast **167**
  bandwidth commands **512**
  bandwidth port commands **513**
  commands **509**
  igmp commands **515**
  igmpcount commands **516**
  igmpfilter commands **518**
  IP address **523**
  mvlan commands **520**
  smcast commands **522**
Multicast VLAN, See MVLAN **59**, **176**, **520**
multimedia **403**
multiple login **723**
Multiple Spanning Tree Protocol, See MSTP. **352**, **354**
Multiple STP, See MSTP **60**
Multi-Tenant Unit, See MTU. **395**
MVLAN **59**, **176**, **520**
  group setup **178**
  port setting **177**
  setup **176**

## N

navigation panel 74
negotiated noise margin mode 220
NetBIOS 114, 465
  filter 114
Network Basic Input/Output System, See NetBIOS 114, 465
Network Time Protocol, See NTP 718
noise 193, 220, 267, 268, 270, 274, 329, 540, 601, 643, 670
non real-time Variable Bit Rate 275
nonvolatile memory 442
normal registration 397
nrt-VBR 275
NTP 718
n-wire mode 272

## O

OAMF5 155, 495
OAMF5 loopback 155, 495
OK response 407
online users 310
operational mode 495, 543
Operational, Administration and Maintenance Function 5 test, See OAMF5. 155, 495
option 82 enable command 450
option mask 192, 194, 206
Organizationally Unique Identifier, See OUI 110
OSPF 174
OUI 110
  filter 110
out-of-band management 386, 503

## P

P2P 360
packet
  counter 318
  filter 113
PAE 60, 563
path cost 352, 359
PBX services 403
PCM 414
PCR 276
Peak Cell Rate, See PCR. 276
Permanent Virtual Circuit, See PVC. 220, 441
permanent VLAN 397
physical machine address 301
physical queues 346
ping 155, 501
pktfilter commands 465
PMM 542
PMMS 573
PNAC 117
Point-to-Point Protocol over Ethernet, See PPPoE. 465
policy 60
port 441
  adsl commands 536
  ADSL setup 186, 189, 190, 259, 261
  alarm setup 133
  commands 525
  copy 227
  number 441
  ppvc commands 565
  pvc commands 569
  redundancy 345
  shdsl commands 572
  states 354
  statistics 310
  trunking 345
  VID 397
  VLAN trunking 363
port enet commands 545
port pots gain command 565
port-based authentication 60
Port-based Network Access Control, See PNAC. 117
POTS 273
pots gain command 565
power 193
power backoff 220, 573
power management mode 192
Power Management, See PMM 542
Power Measurement Modulation Session, See PMMS 573
power mode 192, 542
Power Spectral Density See PSD
Power Spectral Density, See PSD 185, 537
PPPoA-to-PPPoE PVC 60
PPPoE 128, 465
  agent information 466
  filter 114
  intermediate agent information 60
PPVC 62
ppvc commands 565
priority 60
Priority-based PVC, See PPVC 62
private MIB 380

privilege levels 442
product
  model 385
product registration 863
profile 265
  acl commands 598
  ADSL 266
  ADSL alarm 603
  adsl commands 600
  alarm 186
  alarm ADSL 278
  alarm SHDSL 282
  alarm VDSL 280
  alarmadsl commands 603
  alarmshdsl commands 606
  alarmvdsl commands 608
  ATM 221, 277, 610
  atm commands 610
  commands 586
  DSL 186
  ipqos commands 612
  profsvr commands 615
  server 61, 612
  SHDSL 273, 617
  SHDSL alarm 606
  shdsl commands 617
  span alarm 219
  Stuc alarm 219
  Stur alarm 220
  VDSL alarm 608
proxy 167
proxy server
  SIP 405
proxy server statistics 344
PSD 181, 185, 537, 542, 543
PSTN 414
Public Switched Telephone Network 414
pulse code modulation 414
pulse dialing 414
PVC 220, 441
  setup 221
pvc commands 569

## Q

Q-in-Q 209, 212, 263, 576
QoS 274
qschedule commands 708
Quality of Service, See QoS 274
query 515
  VID 170
  VLAN ID 515
queue
  physical 346
  priority 708
  weight 347
queuemap commands 709
queuing 59, 346
  algorithm 346
quiet line noise 329, 494, 643, 670

## R

RA mode 268
Radio Frequency Interference, See RFI. 185, 201
RADIUS 116, 117
  server 731
Rapid Spanning Tree Protocol, See RSTP. 352
Rapid STP, See RSTP. 60
rate 267, 268, 270
rate adaptation 268, 271
rate adaption 185
rate mode 542
rates 266, 272
  configured versus actual 266, 272
reach extended ADSL2 192
real-time transport protocol 413
real-time Variable Bit Rate 275
reboot 166
receive power 193
recovering firmware 773
redundancy 345
Reed Solomon 194, 207
region setting 273
register server
  SIP 405
registration
  fixed 397
  forbidden 397
  normal 397
  product 863
related documentation 3
Remote Authentication Dial In User Service, See RADIUS. 116
removing a transceiver 69
required bandwidth 414
reset 164
resetting the defaults 772
revision level 357
RFC 1213 380
RFC 1305 385, 718
RFC 1573 380

RFC 1757 380, 666
RFC 1889 413
RFC 2131 58, 91
RFC 2132 58, 91
RFC 2138 116
RFC 2139 116
RFC 2486 114, 465
RFC 2662 380
RFC 2665 380
RFC 2674 380
RFC 2863 380
RFC 3046 91
RFC 3440 380
RFC 3635 380
RFC 3636 380
RFC 867 385
RFC 868 385, 718
RFI 185, 201
RIP 174
RMON
  history details 317
  history statistics 316
  MIB (RFC 1757) 380
  MIBs 666
  statistics 314
Rotations Per Minute, See RPM 721
round robin scheduling 347
routing protocols 174
RPM 721
RSTP 60, 352
  path cost 352
  port states 354
RTP 413
rt-VBR 275
run time memory 442

## S

S=0.5 support 195, 207
safety warnings 6
saving configuration 81, 442, 487
SCR 276
screen summary 79
secured client 61, 383
security 61
SELT 497
sensor 721
Service Provider Tag Protocol Identifier, See SP TPID. 210
Service Provider's Network, See SPN 210
session initiation protocol
  see SIP
Set 380
severely errored seconds 280, 281, 607
severity assignment 136
SFP Slot 1 441
SFP slot 2 441
SFP slots 67, 68
SFTP 723, 759
shared secret 121
SHDSL
  advanced port setup 219
  alarm profile 282, 606
  line probing 274
  port setup 214
  profile 273, 617
  rate 272, 273
  rates 272
shielded Ethernet cable 67
shift noise margin 601
show commands 637
signal to noise margin 267, 268, 270, 274
Signal to Noise Ratio, See SNR. 267, 268, 270, 274, 494
Signal-to-Noise Ratio Margin 154
Signal-to-Noise Ratio See SNR
Simple Network Management Protocol, See SNMP 379
Single End Loop Test, See SELT 497
SIP 403
SIP account 404
SIP call progression 405
SIP client 404
SIP client server 404
SIP identities 404
SIP INVITE request 406
SIP number 404
SIP OK response 407
SIP proxy server 405
SIP register server 405
SIP servers 404
SIP service domain 404
SIP URI 404
SIP user agent 405
slot 441
SNMP 379, 723, 726
  MIB II (RFC 1213) 380
snmp commands 726
SNR 185, 267, 268, 270, 274, 494
sound quality 414

SP TPID 210
span alarm profile 219
Spanning Tree Protocol, See STP. 60, 352
specifications 778
speed 330, 364
SPN 210
spoof 58, 97
SPQ 347
SSH 723
standby ports 345
static multicast 61, 174
  group 522, 523
Static Multicast Group 523
static query VID 170
statistics 301
  15Min line performance 326
  1day line performance 327, 328
  ARP table 301
  cell counter 320
  detailed ELC port 330
  detailed Ethernet port 312
  detailed VOP port 332
  DHCP 302
  Dot3ad 334
  ELC port 329
  Ethernet port 311
  H.248 343
  IGMP port statistics 306
  IGMP status 305
  IP 341, 342
  line card 317
  line detail 321
  line performance 323
  MAC table 303, 304
  MSTP 336
  MSTP CIST 336
  MSTP CIST port details 338
  MSTP MSTI 339
  online users 310
  packet counter 318
  port 310
  proxy server 344
  RMON 314
  RMON history 316
  RMON history details 317
  VLAN 335
  VLAN port 336
  VOP port 331
status
  line card 84
STP 60, 352
  designated ports 353
  force version 358
  forwarding delay 358
  hello time 358
  max age 358
  max hops 358
  path cost 352
  port states 354
  root ports 353
Strict Priority Queuing, See SPQ. 347
Stuc alarm profile 219
Stur alarm profile 220
subnet mask 441
subtending mode 362
subtending port 1 441
subtending port 2 441
subtending ports 68
summary of commands 442
Sustained Cell Rate, See SCR. 276
switch bandwidth commands 680
switch bcasctrl commands 682
switch commands 675
switch dot3ad commands 688
switch garptimer commands 690
switch isolation commands 693
switch lockout 771
switch mac aging commands 695
switch mstp commands 695
switch port commands 699
switch port mstp commands 703
switch port setup 364
  bandwidth 365
  broadcast 366, 367, 369
  IEEE 802.1p 365, 369
  IEEE 802.1Q 365, 369
switch port vlantrunk commands 707
switch qschedule commands 708
switch queuemap commands 709
switch setup
  Dot3ad 349
  general 347
  isolation 351
  queuing 350
syntax conventions 4
sys commands 711
sys snmp commands 726
sys syslog commands 729
sys user commands 730
syslog 729
  server 729
  setup 386
syslog commands 729
system
  date 717
  error log 61
  location 720
  name 719

reboot 166
time 716
system information 82
system monitor 390


## T


tag 737
control 397
Tag Control Information. See TCI. 395
Tag Protocol Identifier, See TPID. 395
tagged 397
frames 396, 397
VLAN 395
tagged VLAN
terminology 397
TAT 277
TCI 395
TCP port number 441
telephone keys 414
Telnet 723
temperature 721
terminal emulation 773
Theoretical Arrival Time, See TAT. 277
time 716
server 385, 717
TLS 59, 209, 549, 576
tones 193, 539, 544, 640
Touch Tone® 414
TPID 395
traceroute 156, 504
trademarks 861
traffic
classes 275
parameters 275
shaping 275
transceiver installation 69
transceiver removal 69
transmit
power 193
windowing 195, 207
Transparent LAN Service, See TLS. 59, 209
Trap 380
trap server 727
Trellis 194, 207
trunking 59, 345, 363


## U


UBR 275
UDP port number 441
unavailable seconds 280, 281, 607
uniform resource identifier 404
Universal Time Coordinated, See UTC 718
Unspecified Bit Rate, See UBR. 275
untag 737
untagged 397
frames 396
untagged frames 397
UPBO 183, 185
upgrading firmware 165
uplink mode 362
uplink port 1 441
uplink port 2 441
up-shift noise margin 268, 601
upstream 186
carrier tones 544
rates 267, 270
transmit power 193
Upstream Power Back Off See UPBO
Upstream Power Back Off, See UPBO. 185
user account 387
authentication 389
user agent, SIP 405
user commands 730
user priority 396
VLAN 396
UTC 718


## V


Variable Bit Rate, See VBR. 275
VBR 275
nrt 275
rt 275
VC Mux 221
VCI 441
VDSL
alarm profile 280, 608
interleave delay 270
latency mode 270
Limit PSD Mask 182
rate 270
upstream rate 270
VDSL port setup 198
advanced 199
VID 211, 395

number of possible VIDs 396
priority frame 396
Virtual Channel Indicator, See VCI. 441
virtual local area network
see VLAN
Virtual Local Area Network, See VLAN. 395
Virtual Path Indicator, See VPI. 441
VLAN 395, 415, 735, 771
acceptable frame type 397
administrative control 397
automatic registration 396
CFI 395
dynamic 397
explicit tagging 395
fixed registration 397
forbidden registration 397
forwarding tagged frames 397
forwarding untagged frames 397
GARP 396
GVRP 397
ID 395, 441
IEEE 802.1Q terminology 397
IGMP 515
implicit tagging 395
ingress filtering 397
normal registration 397
number of possible VIDs 396
permanent 397
port 397
port statistics 336
priority frame 396
registration fixed 397
registration forbidden 397
registration normal 397
setup 398
stacking 59, 209, 212, 263, 576
statistics 335
tag control 397
tagged 395, 397
tagged frames 396
TCI 395
TPID 395
trunking 363
untagged 397
untagged frames 396
vlan commands 735
VLAN group 415
VLAN ID 415
VLAN ID tags 415
VLAN tags 415
vlantrunk commands 707
voice coding 414
voice mail 403
Voice over IP 739
commands 739
voice over IP
see VoIP
VoIP 403
voip commands 739
volatile memory 442
voltage 391, 721
VOP port
statistics 331, 332
VPI 441
VT100 773


## W


warranty 862
note 863
waveform codec 414
web configurator
login 73
logout 82
navigation panel 74
save configuration 81
screen summary 79
Weighted Round Robin Scheduling, See WRR. 347
WRR 347


## X


XMODEM upload 773


## Z


ZyNOS 759
ZyXEL Network Operating System, See ZyNOS 759